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Environmental Protection Agency
State of Illinois

**SOIL GAS SURVEY
OF UNDERGROUND STORAGE TANKS AT
SUNTEC INDUSTRIES**

MAY 1, 1989

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PREPARED BY:

**ENVIRONMENTAL RESOURCES MANAGEMENT-NORTH CENTRAL, INC.
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DEERFIELD, ILLINOIS 60015
PROJECT NO.: 9059**

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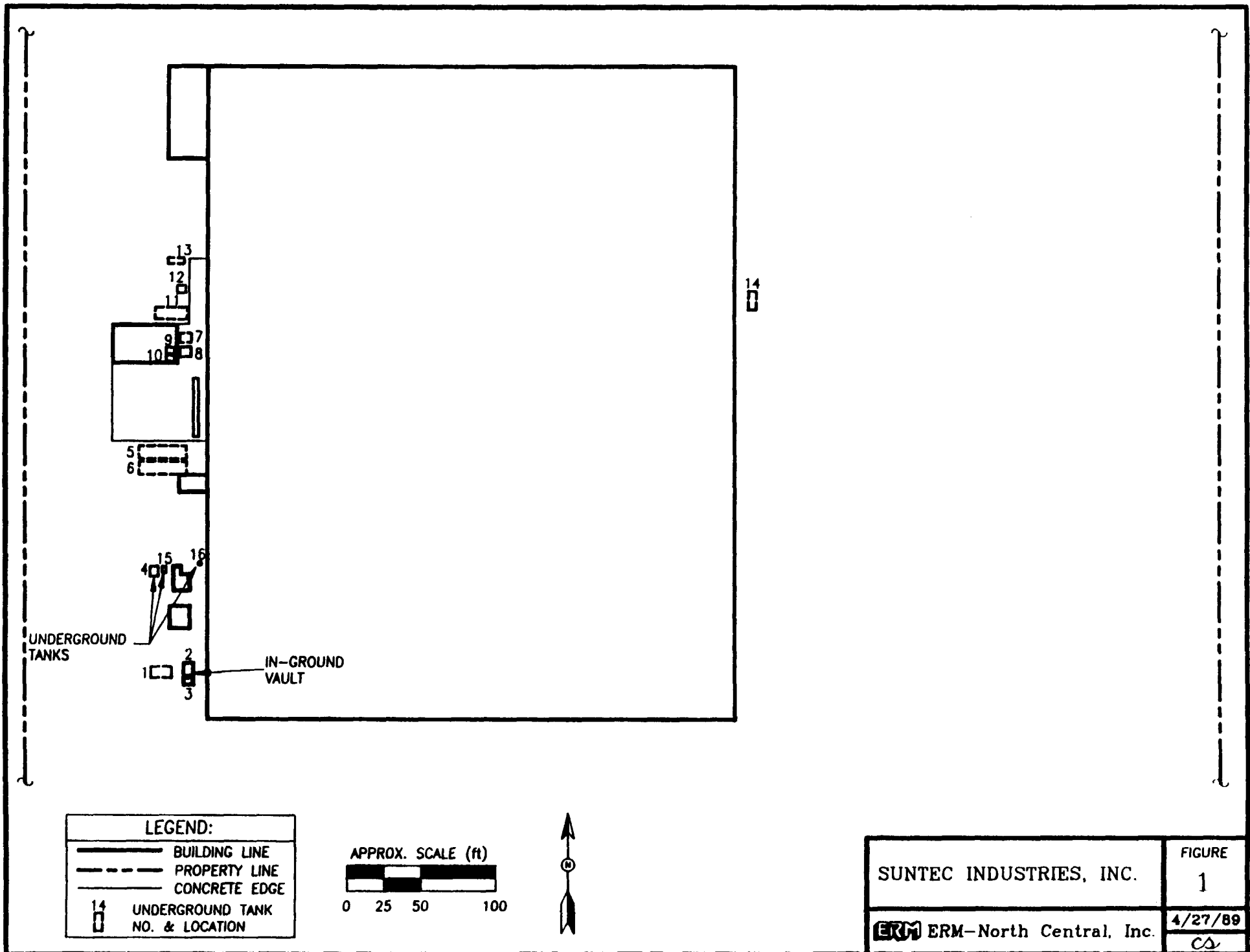
Environmental Protection Agency,
State of Illinois

**SOIL GAS SURVEY
OF UNDERGROUND STORAGE TANKS AT
SUNTEC INDUSTRIES**

1.0 INTRODUCTION

The Suntec Industries, Inc. (Suntec) facility located at 2210 Harrison Avenue, Rockford, Illinois utilized twelve (12) underground storage tanks and two (2) in-ground, vaulted storage tanks for storage of raw materials used in the manufacturing process, waste materials and motor fuels. This facility also utilizes two (2) underground tanks (Tanks Nos. 5 and 6) for storage of fuel oil used for building spaceheating. These tanks were not included in the program activities described in this report. The locations of all storage tanks are shown in Figure 1. All tanks were emptied and cleaned in preparation for closure. Sampling and analysis of soils in the immediate vicinity of these tanks revealed the presence of gasoline components (Tank No. 4) and oils and solvents (Tank Nos. 7, 8, and 9). Based on this analytical data, a notification of potential release from these underground tanks was made to the Illinois Environmental Protection Agency (IEPA) by Suntec on February 9, 1989.

A work plan for an initial investigation of the degree and extent of contamination resulting from the reported releases was prepared and submitted on March 17, 1989 in response to an IEPA request dated February 17, 1989. This initial investigation, performed by Environmental Resources Management-North Central, Inc. (ERM), consisted of a soil gas survey of the western portion of the facility property containing the underground storage tanks.



The following sections of this report describe the survey methodology, presents all survey data, conclusions and recommendations, and proposes additional investigative steps based on survey results.

2.0 SURVEY METHODOLOGY

The objective of this survey was to determine the lateral extent of any near-surface soil contamination through the collection and screening of soil gas for volatile organics. A 25 foot by 25 foot grid network tied to the western property line was used to locate the gas sampling points. The soil gas procedure requires driving a perforated stainless steel probe into the soil and pulling a known quantity of soil vapor through a Teflon tube sampling train. An HNu photoionization detector is used to obtain field measurement of volatile organic concentrations in the soil gas. Activated carbon sampling tubes are utilized to absorb and collect the soil gas components, primarily volatile organic compounds. Subsequent carbon tube desorption and laboratory analysis is used to qualitatively identify the gas components.

3.0 SURVEY RESULTS

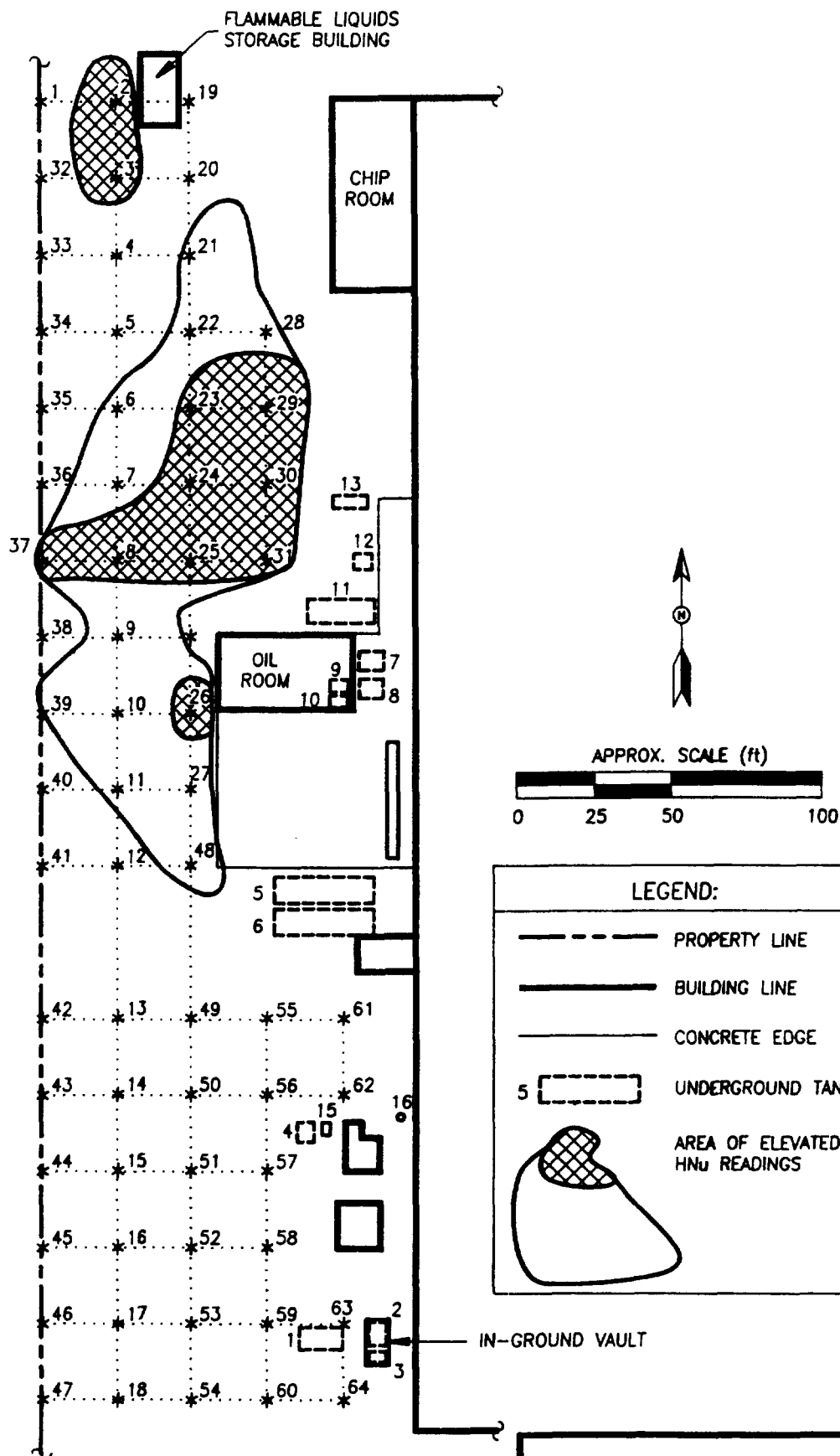
HNu meter readings were recorded for all gas sampling points. Gas samples were collected on activated carbon tubes from selected sampling nodes where field HNu readings exceeded 5 Vppm. A total of 64 gas sampling points were tested in the survey. Carbon tube samples were obtained at ten (10) locations, and were analyzed for specific volatile organics.

Appendix A presents all HNu meter readings recorded during the survey. A representation of the areal extent of measured elevated levels of volatile organics, based on survey data, is shown in Figure 2. These areas have been subdivided to indicate the location and size of areas where HNu meter readings exceeded 5 Vppm. Areas where HNu readings exceeded 10 Vppm are shown as cross-hatched areas in Figure 2.

The cross-hatched area immediately west of the Oil Room contained the highest survey meter reading, 95 Vppm. Meter readings in the area located west of the Tank Nos. 12 and 13 ranged from 4 to 20 Vppm. Meter readings in this area generally decreased with distance from the underground tanks. The cross-hatched area adjacent to the Flammable Liquid Storage Building contained volatile organic vapor levels ranging from 10 to 35 Vppm. Survey data indicates that the area of soil contamination extends to the western property boundary at Gas Sampling Points 37 and 39.

The soil gas survey indicated that no significant soil contamination exists at a depth of approximately 4 feet in the southern portion of the underground tank area. Specifically, the survey data indicates that any spillage or leakage of gasoline that may have occurred in the area of Tank No. 4 has not resulted in wide-spread contamination of near-surface soils.

Activated carbon collection tubes were used to identify the soil gas components in the those areas where HNu readings exceeded 10 Vppm. Analysis by the Milwaukee, Wisconsin laboratory of Radian Corporation determined the major gas components to be chlorinated solvents such as trichloroethene, trichloroethane, dichloroethene, and dichloroethane. All laboratory data is presented in Appendix B.



SOIL GAS SURVEY RESULTS

FIGURE

2

ERM North Central, Inc.

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CS

4.0 SURVEY CONCLUSIONS AND RECOMMENDATIONS

The soil gas survey determined that no significant near-surface soil contamination exists in the southern portion of the underground tank area. The data indicated that any spillage or leakage of gasoline that may have occurred in the area of Tank No. 4 has not resulted in wide-spread contamination of near-surface soils. ERM recommends that Suntec proceed with all steps necessary for closure in-place of the underground tanks in the southern portion, except Tank No. 4. We recommend that Tank No. 4 be excavated and soil samples be taken to confirm the presence or absence of significant soil contamination.

The soil gas survey identified three distinct areas of near-surface soil contamination in the northern portion of the underground tank area. The survey data indicated that the identified areas of soil contamination extends to Suntec's western property boundary. ERM recommends that additional testing be performed to determine the vertical extent of contamination in the areas identified by the soil gas survey. Further, we recommend that soil gas testing be used to screen the off-site area and the portion of the facility property to the north that the original survey indicated was potentially contaminated.

5.0 PHASE II INVESTIGATION WORK PLAN

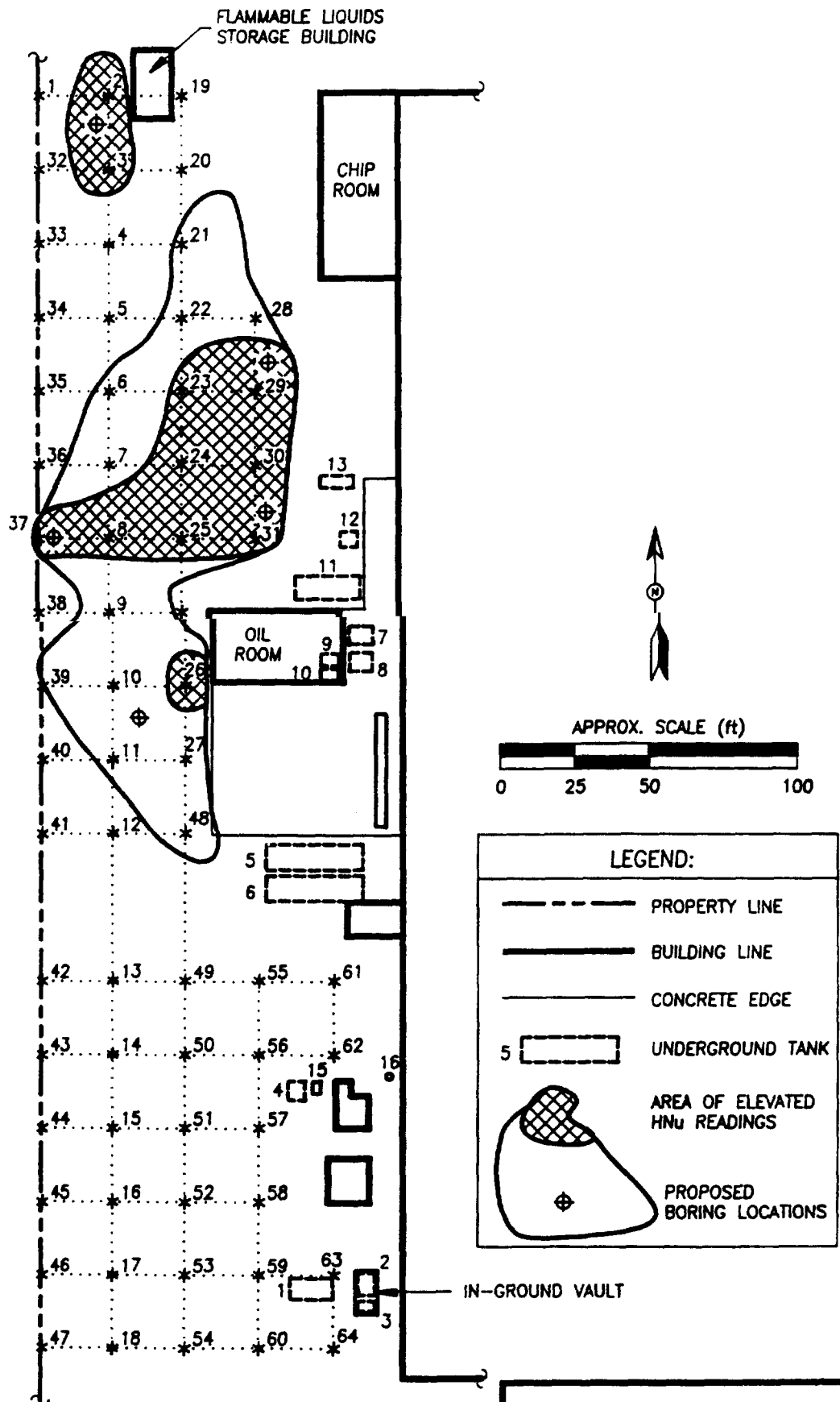
The Investigation Work Plan presented in this section incorporates the recommended actions resulting from the soil gas survey.

5.1 Vertical Extent of Contamination

The vertical extent of contamination in the three (3) areas of near-surface contamination will be determined using a series of five (5) soil borings. The proposed locations for these borings are shown in Figure 3. Actual boring locations will be selected by an ERM geologist based on field conditions. Soil samples will be composited vertically over 2-foot intervals and screened for organics using an HNu photoionization detector. Samples will be obtained from ground surface to a depth where:

1. Metering screening indicates the lack of measurable volatile organics, or
2. The saturated zone is encountered.

If the HNu screening indicates that soil contamination ends above the ground water table, a soil sample will be submitted for confirmatory laboratory analysis of volatile organics (VOCs) and isopropyl alcohol. These analytical parameters were chosen because Tank Nos 11, 12 and 13, which contained fresh solvent, waste solvent and isopropyl alcohol respectively, are potential sources of contamination. If the HNu screening indicates that soil contamination extends to the ground water interface, 1) a soil sample, taken at the interface, will be submitted for



PROPOSED
BORING LOCATIONS

FIGURE
3

ERM ERM-North Central, Inc.

5/1/89
CA

laboratory analysis of VOCs and isopropyl alcohol, 2) based on site conditions, one of the borings will be converted to a monitoring well, and 3) following well development, a sample of ground water will be taken.

If necessary, ground water samples will also be taken from the facility's eastern boundary to represent upgradient ground water characteristics. The number of ground water samples submitted for laboratory analysis of VOCs and isopropyl alcohol will be determined based on the number and location of monitoring wells installed in order to provide the best characterization of site ground water quality.

5.2 Soil Gas Survey

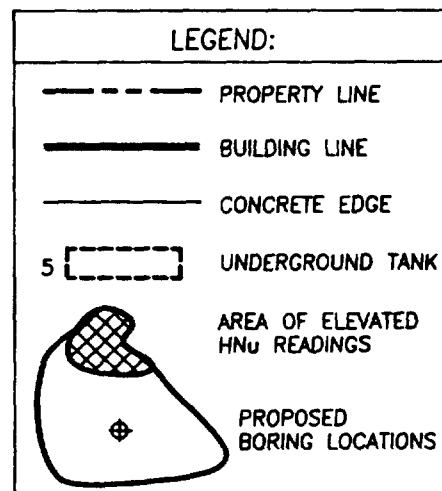
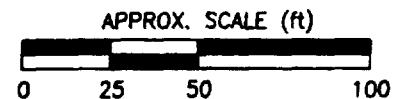
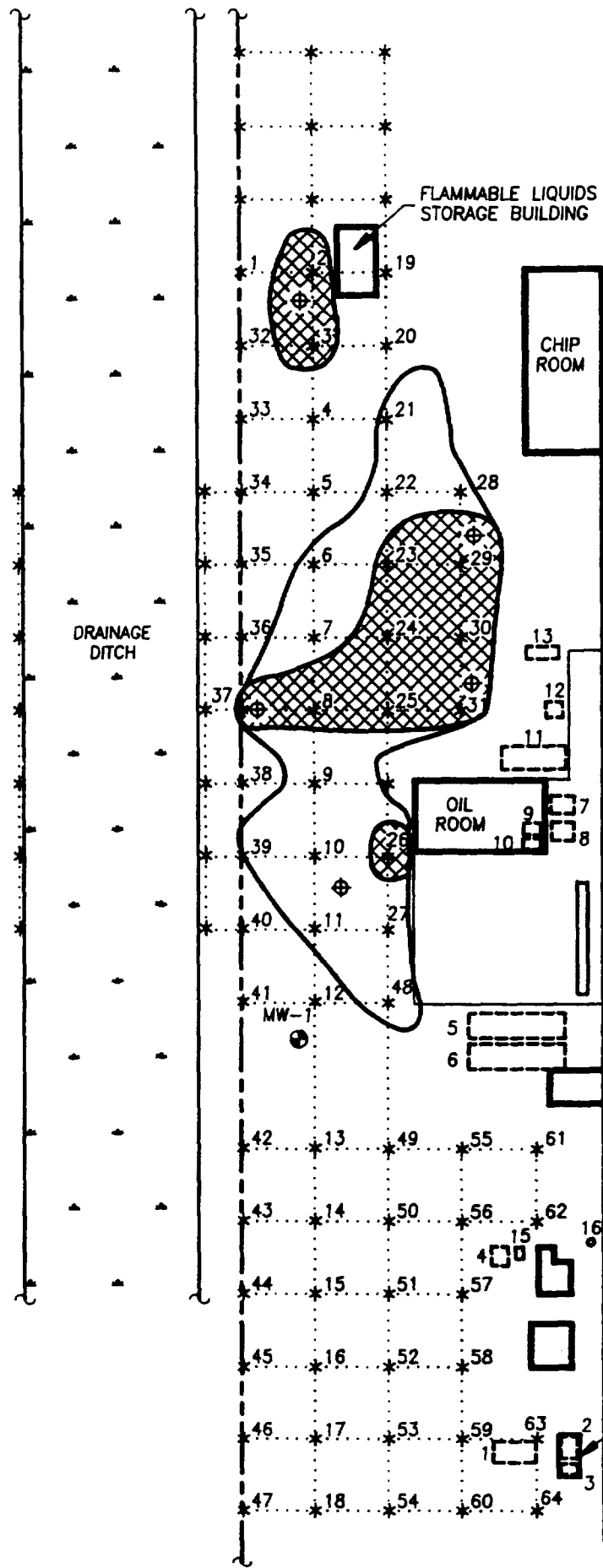
The initial soil gas survey indicated that there are areas of potentially significant near-surface soil contamination beyond the area investigated. The Phase II Work Plan includes performing soil gas surveys in these suspect areas. Figure 4 presents the areas to be included in these follow-up investigations. The area beyond the facility's western boundary to be investigated is approximately 150 feet by 75 feet. The facility property to the north of the original survey grid to be investigated is approximately 75 feet by 75 feet.

Two lines of sampling points paralleling the concrete drainage ditch will be used in the vacant land beyond the facility's western boundary. A sampling network, based on a 25-foot by 25-foot grid, will be used in the facility area. The objective of these investigations is to further define the lateral extent of near-surface soil contamination. Therefore, no collection or analysis of gas samples beyond HNu meter screening will be

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IN-GROUND VAULT

<p>PROPOSED SOIL GAS SURVEYS</p>	<p>FIGURE 4</p>
<p>ERM North Central, Inc.</p>	<p>5/1/89</p>
	<p>CS</p>

performed. The survey data will be used to determine if characterization of subsurface conditions is necessary. Any additional investigation can be incorporated into an expanded version of the activities presented in Section 5.1.

5.3 Tank No. 4 Closure

The soil gas survey determined that no significant near-surface soil contamination exists in the southern portion of the underground tank area. The closure of Tank No. 4 will follow the procedures presented in Federal regulations governing underground storage tanks. Notification of the intent to close will be made to the Illinois State Fire Marshal's Office thirty (30) days prior to excavation and removal. Overburden soil and backfill material will be screened for the presence of contamination during excavation using an HNu photoionization meter. Any material producing a meter reading in excess of 10 Vppm will be segregated as contaminated soil for subsequent handling and disposal. Clean overburden and backfill will be set aside for use as excavation backfill. The steel tank will be removed, cut up and disposed of as scrap metal. Following tank removal, the excavation side walls and bottom will be screened for contamination using an HNu meter. Soil excavation will continue until field screening indicates that all measurable contamination has been removed. A composite soil sample will be prepared using a minimum of five (5) sampling points located in the excavation bottom and sidewalls. This composite sample will be submitted for laboratory analysis of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds and EP Toxicity lead. IEPA Target Cleanup Objectives for Soil will be compared to the sampled analytical data to confirm that no significant soil contamination is present. If laboratory analysis indicates that no significant

contamination exists, the excavation will be backfilled to grade with clean soil and bank run gravel. A report documenting all closure activities will be submitted to the IEPA and the State Fire Marshal's Office.

5.4 In-Place Closure Activities

The soil gas survey determined that no significant near-surface soil contamination exists in the southern portion of the underground tank area. Therefore, application will be made to the State Fire Marshall's Office for closure in-place of Tank Nos. 1 and 15. This application will include an engineer's opinion that excavation of the volume of material necessary to expose and remove these tanks would structurally endanger nearby facility buildings.

Following approval of the in-place closure application, both tanks will be filled with an inert solid and the excavations backfilled to grade. A report documenting all in-place closure activities will be prepared and submitted to the IEPA and the State Fire Marshall's Office.

6.0 PHASE II INVESTIGATION SCHEDULE

The propose schedule for Phase II activities is presented in Table 1. Actual scheduling is dependant upon the availability of subcontractors and unforeseen delays due to weather or site conditions. As of this time, access authorization to the property to the west of the plant has not been obtained; if authorization is not received within a reasonable time, the schedule may be extended.

TABLE 1
PHASE II INVESTIGATION SCHEDULE

<u>ACTIVITY</u>	<u>ESTIMATED DURATION</u>	<u>PROPOSED COMPLETION DATE</u>
Soil Gas Surveys	2 days	May 24, 1989
Soil Borings	1 week	May 26, 1989
Monitor Well Installation(s)	2 days	May 31, 1989
Subsurface Investigation Report		June 30, 1989
Tank No. 4 Closure		
Field Work	1 week	May 26, 1989
Closure Report	4 weeks	June 30, 1989
In-Place Closure		
Application	1 week	May 12, 1989
Field Work	1 week	May 19, 1989
Closure Report	1 week	May 26, 1989

APPENDIX A

APPENDIX A
SOIL GAS SURVEY DATA

<u>Sampling Point</u>	<u>Depth, Feet</u>	<u>HNu Meter Reading, Vppm</u>
1	2.0	0.0
2	3.5	35.0
3	3.5	10.6
4	3.5	0.0
5	3.5	0.5
6	3.5	3.0
7	3.5	4.8
8	3.5	5.0
9	3.5	2.0
10	3.5	2.5
11	3.5	4.6
12	3.5	0.8
13	3.5	0.0
14	3.5	0.0
15	3.5	0.3
16	3.5	1.0
17	3.5	1.0
18	3.5	1.0
19	3.5	0.0
20	3.5	0.6
21	3.5	1.1
22	3.5	1.0
23	3.5	4.9
24	3.5	11.2
25	3.5	15.0
26	3.5	95.0
27	3.5	1.3
28	3.5	0.4
29	4.0	6.2
30	3.5	8.5
31	3.5	20.0
32	3.5	0.0
33	3.5	0.0
34	3.5	0.0
35	3.5	0.0
36	3.5	0.0
37	3.5	4.0
38	3.5	0.0
39	3.5	3.8
40	3.5	0.0
41	3.5	0.0
42	3.5	0.1
43	3.5	0.0
44	3.5	1.4
45	3.5	0.2
46	3.5	0.0

APPENDIX A (continued)

SOIL GAS SURVEY DATA

<u>Sampling Point</u>	<u>Depth, Feet</u>	<u>HNu Meter Reading, Vppm</u>
47	3.5	0.0
48	3.5	1.4
49	3.5	0.1
50	3.5	0.0
51	3.5	0.0
52	3.5	0.1
53	3.5	0.0
54	3.5	0.8
55	3.5	0.0
56	3.5	0.4
57	3.5	0.4
58	3.5	0.0
59	3.5	0.0
60	3.5	0.0
61	3.5	0.0
62	3.5	0.0
63	3.5	0.0
64	3.5	0.0

APPENDIX B

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Received: 03/31/89


RADIAN CORP. REPORT
04/06/89 04:00:18

Work Order # M9-03-049

REPORT ERM North Central
TO 102 Wilmont Road
Deerfield, Illinois 60018

ATTEN Mr. James Kane

PREPARED Radian Corporation
BY Milwaukee Office
5103 West Beloit Road
Milwaukee, WI 53214
ATTEN Charles S. Applegate
PHONE (414)643-2768


CERTIFIED BY
CONTACT C_APPLEGATE

CLIENT ERM SAMPLES 10
COMPANY ERM North Central
FACILITY 102 Wilmont Road
Deerfield, Illinois 60018

State of Wisconsin - Certified Laboratory
No. 241293910

WORK ID ERM JOB # 9059
TAKEN 03/29/89 BY MER,CJB,MLB
TRANS FEX EX AIRBILL # 2014690403
TYPE CARBON TUBES
P.O. #
INVOICE under separate cover

RADIAN PROJECT NUMBER 207-027-23-01

SAMPLE IDENTIFICATION
01 CARBON TUBE SG-2 LOC. 2
02 CARBON TUBE SG-23
03 CARBON TUBE SG-24
04 CARBON TUBE SG-25
05 CARBON TUBE SG-26
06 CARBON TUBE SG-31
07 CARBON TUBE SG-30
08 CARBON TUBE SG-3
09 CARBON TUBE SG-8
10 CARBON TUBE SG-37

TEST CODES and NAMES used on this report
8010 HALOGENATED VOLITILE ORGN.
8020B AROMATIC VOLITILE ORGANICS

Page 2
Received: 03/31/89

RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-2 LOC. 2 FRACTION 01A TEST CODE 8010 NAME HALOGENATED VOLITILE ORGN.
Date & Time Collected 03/29/89 Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST MM FILE # VERIFIED MM
INSTRMT TRACOR INJECTD 04/05/89 FACTOR 500.00 UNITS ng/tube

CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	10000	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	ND	550	500.00
75-35-4	1,1-Dichloroethene	ND	20	500.00
75-34-3	1,1-Dichloroethane	6800	390	500.00
156-60-5	trans-1,2-Dichloroethene	10500	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	1760	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	ND	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	ND	250	500.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

Page 3
Received: 03/31/89

RADIAN CORP.
Results by Sample

REPORT

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-2 LOC. 2

FRACTION 01A TEST CODE 8020B
Date & Time Collected 03/29/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
71-43-2	Benzene	300	15	500.00
108-88-3	Toluene	ND	190	500.00
100-41-4	Ethylbenzene	ND	260	500.00
108-90-7	Chlorobenzene	ND	330	500.00
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00
541-73-1	1,3-Dichlorobenzene	ND	500	500.00
95-50-1	1,2-Dichlorobenzene	ND	800	500.00
108-38-3	m-Xylene	7700	650	500.00
Mixture	o, p-Xylene	ND	550	500.00

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NAX recovery

Page 4
Received: 03/31/89

RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-23

FRACTION 02A TEST CODE 8010
Date & Time Collected 03/29/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT TRACOR		FACTOR	UNITS	ng/tube

INJECTD 04/04/89

100.00

CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	660	100.00
74-83-9	Bromomethane	ND	1500	100.00
75-71-8	Dichlorodifluoromethane	ND	10000	100.00
75-01-4	Vinyl Chloride	ND	320	100.00
75-00-3	Chloroethane	ND	220	100.00
75-09-2	Methylene Chloride	ND	63	100.00
75-69-4	Trichlorofluoromethane	1800	110	100.00
75-35-4	1,1-Dichloroethene	3900	4.0	100.00
75-34-3	1,1-Dichloroethane	40300	77	100.00
156-60-5	trans-1,2-Dichloroethene	41300	5.0	100.00
67-66-3	Chloroform	3440	23	100.00
107-06-2	1,2-Dichloroethane	ND	34	100.00
71-55-6	1,1,1-Trichloroethane	124300	15	100.00
56-23-5	Carbon Tetrachloride	ND	21	100.00
75-27-4	Bromodichloromethane	ND	49	100.00
78-87-5	1,2-Dichloropropane	ND	29	100.00
10061-02-6	trans-1,3-Dichloropropene	ND	120	100.00
79-01-6	Trichloroethene	23500	5.0	100.00
124-48-1	Dibromochloromethane	ND	280	100.00
79-00-5	1,1,2-Trichloroethane	ND	100	100.00
10061-01-5	cis-1,3-Dichloropropene	ND	160	100.00
100-75-8	2-Chloroethylvinyl Ether	ND	280	100.00
75-25-2	Bromoform	ND	4600	100.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	100	100.00
127-18-4	Tetrachloroethene	7500	49	100.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

Page 5
Received: 03/31/89

RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-23

FRACTION 02A TEST CODE 8020B
Date & Time Collected 03/29/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/04/89	FACTOR	100.00 UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
71-43-2	Benzene	ND	20	100.00
108-88-3	Toluene	46	37	100.00
100-41-4	Ethylbenzene	64	52	100.00
108-90-7	Chlorobenzene	ND	65	100.00
106-46-7	1,4-Dichlorobenzene	ND	250	100.00
541-73-1	1,3-Dichlorobenzene	210	100	100.00
95-50-1	1,2-Dichlorobenzene	ND	160	100.00
108-38-3	m-Xylene	ND	130	100.00
Mixture	o, p-Xylene	110	110	100.00

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NA% recovery

Page 6
Received: 03/31/89

RADIAN CORP.
Results by Sample

REPORT

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-24

FRACTION 03A TEST CODE 8010
Date & Time Collected 03/29/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR 500.00	UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	ND	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	2200	550	500.00
75-35-4	1,1-Dichloroethene	6980	20	500.00
75-34-3	1,1-Dichloroethane	153000	390	500.00
156-60-5	trans-1,2-Dichloroethene	210000	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	430000	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	74600	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	18800	250	500.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-24

FRACTION 03A TEST CODE 8020B
Date & Time Collected 03/29/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
71-43-2	Benzene	ND	100	500.00
108-88-3	Toluene	ND	190	500.00
100-41-4	Ethylbenzene	ND	260	500.00
108-90-7	Chlorobenzene	ND	330	500.00
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00
541-73-1	1,3-Dichlorobenzene	ND	500	500.00
95-50-1	1,2-Dichlorobenzene	ND	800	500.00
108-38-3	m-Xylene	ND	650	500.00
Mixture	o, p-Xylene	ND	550	500.00

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NA% recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-25

FRACTION 04A TEST CODE 8010
Date & Time Collected 03/29/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR 200.00	UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	1300	200.00
74-83-9	Bromomethane	ND	3000	200.00
75-71-8	Dichlorodifluoromethane	ND	20000	200.00
75-01-4	Vinyl Chloride	ND	640	200.00
75-00-3	Chloroethane	ND	440	200.00
75-09-2	Methylene Chloride	ND	130	200.00
75-69-4	Trichlorofluoromethane	1780	220	200.00
75-35-4	1,1-Dichloroethene	2760	8.0	200.00
75-34-3	1,1-Dichloroethane	118800	150	200.00
156-60-5	trans-1,2-Dichloroethene	146800	10	200.00
67-66-3	Chloroform	ND	46	200.00
107-06-2	1,2-Dichloroethane	ND	68	200.00
71-55-6	1,1,1-Trichloroethane	280000	30	200.00
56-23-5	Carbon Tetrachloride	ND	42	200.00
75-27-4	Bromodichloromethane	ND	98	200.00
78-87-5	1,2-Dichloropropane	ND	58	200.00
10061-02-6	trans-1,3-Dichloropropene	ND	240	200.00
79-01-6	Trichloroethene	36500	10	200.00
124-48-1	Dibromochloromethane	ND	560	200.00
79-00-5	1,1,2-Trichloroethane	ND	200	200.00
10061-01-5	cis-1,3-Dichloropropene	ND	320	200.00
100-75-8	2-Chloroethylvinyl Ether	ND	560	200.00
75-25-2	Bromoform	ND	9200	200.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	200	200.00
127-18-4	Tetrachloroethene	3700	98	200.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-25

FRACTION 04A TEST CODE 8020B
Date & Time Collected 03/29/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	200.00 UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
71-43-2	Benzene	ND	40	200.00
108-88-3	Toluene	ND	74	200.00
100-41-4	Ethylbenzene	ND	100	200.00
108-90-7	Chlorobenzene	ND	130	200.00
106-46-7	1,4-Dichlorobenzene	ND	500	200.00
541-73-1	1,3-Dichlorobenzene	ND	200	200.00
95-50-1	1,2-Dichlorobenzene	ND	320	200.00
108-38-3	m-Xylene	ND	260	200.00
Mixture	o, p-Xylene	ND	220	200.00

SURROGATE

98-08-8 a, a, a-Trifluorobenzene N/A% recovery

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Environmental Protection Agency
State of Illinois

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RADIAN CORP.
Results by Sample

REPORT

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-26

FRACTION 05A TEST CODE 8010
Date & Time Collected 03/29/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM		
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00	UNITS	ng/tube

CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	ND	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	ND	550	500.00
75-35-4	1,1-Dichloroethene	ND	20	500.00
75-34-3	1,1-Dichloroethane	39500	390	500.00
156-60-5	trans-1,2-Dichloroethene	5100	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	57400	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	ND	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	ND	250	500.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-26

FRACTION 05A TEST CODE 8020B
Date & Time Collected 03/29/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM	
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR	
71-43-2	Benzene	ND	100	500.00	
108-88-3	Toluene	11600	190	500.00	
100-41-4	Ethylbenzene	ND	260	500.00	
108-90-7	Chlorobenzene	ND	330	500.00	
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00	
541-73-1	1,3-Dichlorobenzene	ND	500	500.00	
95-50-1	1,2-Dichlorobenzene	ND	800	500.00	
108-38-3	m-Xylene	ND	650	500.00	
Mixture	o,p-Xylene	ND	550	500.00	

SURROGATE

98-08-8 a,a,a-Trifluorobenzene NA% recovery

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RADIAN CORP.
Results by Sample

REPORT

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-31

FRACTION 06A TEST CODE 8010
Date & Time Collected 03/30/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM		
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	200.00	UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR		
74-87-3	Chloromethane	ND	1300	200.00		
74-83-9	Bromomethane	ND	3000	200.00		
75-71-8	Dichlorodifluoromethane	ND	20000	200.00		
75-01-4	Vinyl Chloride	ND	640	200.00		
75-00-3	Chloroethane	ND	440	200.00		
75-09-2	Methylene Chloride	ND	130	200.00		
75-69-4	Trichlorofluoromethane	ND	220	200.00		
75-35-4	1,1-Dichloroethene	ND	8.0	200.00		
75-34-3	1,1-Dichloroethane	19400	150	200.00		
156-60-5	trans-1,2-Dichloroethene	71100	10	200.00		
67-66-3	Chloroform	ND	46	200.00		
107-06-2	1,2-Dichloroethane	ND	68	200.00		
71-55-6	1,1,1-Trichloroethane	6500	30	200.00		
56-23-5	Carbon Tetrachloride	ND	42	200.00		
75-27-4	Bromodichloromethane	ND	98	200.00		
78-87-5	1,2-Dichloropropane	ND	58	200.00		
10061-02-6	trans-1,3-Dichloropropene	ND	240	200.00		
79-01-6	Trichloroethene	ND	10	200.00		
124-48-1	Dibromochloromethane	ND	560	200.00		
79-00-5	1,1,2-Trichloroethane	ND	200	200.00		
10061-01-5	cis-1,3-Dichloropropene	ND	320	200.00		
100-75-8	2-Chloroethylvinyl Ether	ND	560	200.00		
75-25-2	Bromoform	ND	9200	200.00		
79-34-5	1,1,2,2-Tetrachloroethane	ND	200	200.00		
127-18-4	Tetrachloroethene	ND	98	200.00		

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-31

FRACTION 06A TEST CODE 8020B
Date & Time Collected 03/30/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM	
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	200.00 UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR	
71-43-2	Benzene	ND	40	200.00	
108-88-3	Toluene	ND	74	200.00	
100-41-4	Ethylbenzene	ND	100	200.00	
108-90-7	Chlorobenzene	ND	130	200.00	
106-46-7	1,4-Dichlorobenzene	ND	500	200.00	
541-73-1	1,3-Dichlorobenzene	ND	200	200.00	
95-50-1	1,2-Dichlorobenzene	ND	320	200.00	
108-38-3	m-Xylene	4760	260	200.00	
Mixture	o, p-Xylene	ND	220	200.00	

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NAX recovery

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RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-30

FRACTION 07A TEST CODE 8010
Date & Time Collected 03/30/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT TRACOR	INJECTD 04/05/89	FACTOR 500.00	UNITS	ng/tube

CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	ND	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	ND	550	500.00
75-35-4	1,1-Dichloroethene	ND	20	500.00
75-34-3	1,1-Dichloroethane	5200	390	500.00
156-60-5	trans-1,2-Dichloroethene	28200	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	7300	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	2060	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	ND	250	500.00

SURROGATES		
74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-30

FRACTION 07A TEST CODE 8020B
Date & Time Collected 03/30/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
71-43-2	Benzene	ND	100	500.00
108-88-3	Toluene	ND	190	500.00
100-41-4	Ethylbenzene	ND	260	500.00
108-90-7	Chlorobenzene	ND	330	500.00
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00
541-73-1	1,3-Dichlorobenzene	ND	500	500.00
95-50-1	1,2-Dichlorobenzene	ND	800	500.00
108-38-3	m-Xylene	780	650	500.00
Mixture	o,p-Xylene	ND	550	500.00

SURROGATE

98-08-8 a, a, a-Trifluorobenzene N/A% recovery

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RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-3

FRACTION 08A TEST CODE 8010
Date & Time Collected 03/30/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM		
INSTRMT	TRACDR	INJECTD 04/05/89	FACTOR	500.00	UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR		
74-87-3	Chloromethane	ND	3300	500.00		
74-83-9	Bromomethane	ND	7500	500.00		
75-71-8	Dichlorodifluoromethane	ND	50000	500.00		
75-01-4	Vinyl Chloride	ND	1600	500.00		
75-00-3	Chloroethane	ND	1100	500.00		
75-09-2	Methylene Chloride	ND	320	500.00		
75-69-4	Trichlorofluoromethane	ND	550	500.00		
75-35-4	1,1-Dichloroethene	ND	20	500.00		
75-34-3	1,1-Dichloroethane	1240	390	500.00		
156-60-5	trans-1,2-Dichloroethene	2100	25	500.00		
67-66-3	Chloroform	ND	120	500.00		
107-06-2	1,2-Dichloroethane	ND	170	500.00		
71-55-6	1,1,1-Trichloroethane	7300	75	500.00		
56-23-5	Carbon Tetrachloride	ND	110	500.00		
75-27-4	Bromodichloromethane	ND	250	500.00		
78-87-5	1,2-Dichloropropane	ND	150	500.00		
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00		
79-01-6	Trichloroethene	ND	25	500.00		
124-48-1	Dibromochloromethane	ND	1400	500.00		
79-00-5	1,1,2-Trichloroethane	ND	500	500.00		
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00		
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00		
75-25-2	Bromoform	ND	23000	500.00		
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00		
127-18-4	Tetrachloroethene	ND	250	500.00		

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-3

FRACTION 08A TEST CODE 8020B
Date & Time Collected 03/30/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	INSTRMT	TRACOR	INJECTD	04/05/89	FILE #	FACTOR	500.00	UNITS	ng/tube	VERIFIED	MM
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR								
71-43-2	Benzene	ND	100	500.00								
108-88-3	Toluene	ND	190	500.00								
100-41-4	Ethylbenzene	ND	260	500.00								
108-90-7	Chlorobenzene	ND	330	500.00								
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00								
541-73-1	1,3-Dichlorobenzene	ND	500	500.00								
95-50-1	1,2-Dichlorobenzene	ND	800	500.00								
108-38-3	m-Xylene	ND	650	500.00								
Mixture	o, p-Xylene	ND	550	500.00								

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NA% recovery

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Results by Sample

REPORT

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-8

FRACTION 09A TEST CODE 8010
Date & Time Collected 03/30/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR 500.00	UNITS ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	ND	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	ND	550	500.00
75-35-4	1,1-Dichloroethene	1360	20	500.00
75-34-3	1,1-Dichloroethane	17200	390	500.00
156-60-5	trans-1,2-Dichloroethene	14500	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	60500	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	18000	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	ND	250	500.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-8

FRACTION 09A TEST CODE 8020B
Date & Time Collected 03/30/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM	
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR	
71-43-2	Benzene	ND	100	500.00	
108-88-3	Toluene	ND	190	500.00	
100-41-4	Ethylbenzene	ND	260	500.00	
108-90-7	Chlorobenzene	ND	330	500.00	
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00	
541-73-1	1,3-Dichlorobenzene	ND	500	500.00	
95-50-1	1,2-Dichlorobenzene	ND	800	500.00	
108-38-3	m-Xylene	ND	650	500.00	
Mixture	o, p-Xylene	ND	550	500.00	

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NA% recovery

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RADIAN CORP.
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-37

FRACTION 10A TEST CODE 8010
Date & Time Collected 03/30/89

NAME HALOGENATED VOLITILE ORGN.
Category

ORGANIC ANALYSIS DATA SHEET - PURGEABLE HALOCARBONS

ANALYST	MM	FILE #	VERIFIED	MM
INSTRMT	TRACOR	FACTOR	UNITS	ng/tube
		500.00		
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR
74-87-3	Chloromethane	ND	3300	500.00
74-83-9	Bromomethane	ND	7500	500.00
75-71-8	Dichlorodifluoromethane	ND	50000	500.00
75-01-4	Vinyl Chloride	ND	1600	500.00
75-00-3	Chloroethane	ND	1100	500.00
75-09-2	Methylene Chloride	ND	320	500.00
75-69-4	Trichlorofluoromethane	ND	550	500.00
75-35-4	1,1-Dichloroethene	ND	20	500.00
75-34-3	1,1-Dichloroethane	960	390	500.00
156-60-5	trans-1,2-Dichloroethene	ND	25	500.00
67-66-3	Chloroform	ND	120	500.00
107-06-2	1,2-Dichloroethane	ND	170	500.00
71-55-6	1,1,1-Trichloroethane	9740	75	500.00
56-23-5	Carbon Tetrachloride	ND	110	500.00
75-27-4	Bromodichloromethane	ND	250	500.00
78-87-5	1,2-Dichloropropane	ND	150	500.00
10061-02-6	trans-1,3-Dichloropropene	ND	600	500.00
79-01-6	Trichloroethene	2600	25	500.00
124-48-1	Dibromochloromethane	ND	1400	500.00
79-00-5	1,1,2-Trichloroethane	ND	500	500.00
10061-01-5	cis-1,3-Dichloropropene	ND	800	500.00
100-75-8	2-Chloroethylvinyl Ether	ND	1400	500.00
75-25-2	Bromoform	ND	23000	500.00
79-34-5	1,1,2,2-Tetrachloroethane	ND	500	500.00
127-18-4	Tetrachloroethene	ND	250	500.00

SURROGATES

74-97-5	Bromochloromethane	NA % Recovery
Mixture	2-Bromo-1-chloropropane	NA % Recovery

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Received: 03/31/89

RADIAN CORP. REPORT
Results by Sample

Work Order # M9-03-049

SAMPLE ID CARBON TUBE SG-37

FRACTION 10A TEST CODE 8020B
Date & Time Collected 03/30/89

NAME AROMATIC VOLITILE ORGANICS
Category

ORGANICS ANALYSIS DATA SHEET - PURGEABLE AROMATICS

ANALYST	MM	FILE #	VERIFIED	MM	
INSTRMT	TRACOR	INJECTD 04/05/89	FACTOR	500.00 UNITS	ng/tube
CAS#	COMPOUND	RESULT	DET LIMIT	FACTOR	
71-43-2	Benzene	ND	100	500.00	
108-88-3	Toluene	ND	190	500.00	
100-41-4	Ethylbenzene	ND	260	500.00	
108-90-7	Chlorobenzene	ND	330	500.00	
106-46-7	1,4-Dichlorobenzene	ND	1300	500.00	
541-73-1	1,3-Dichlorobenzene	ND	500	500.00	
95-50-1	1,2-Dichlorobenzene	ND	800	500.00	
108-38-3	m-Xylene	ND	650	500.00	
Mixture	o, p-Xylene	ND	550	500.00	

SURROGATE

98-08-8 a, a, a-Trifluorobenzene NA% recovery

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RADIAN CORP.

REPORT

Work Order # M9-03-049

Received: 03/31/89

Test Methodology

TEST CODE 8010 NAME HALOGENATED VOLITILE ORGN.

Method not available.

TEST CODE 8020B NAME AROMATIC VOLITILE ORGANICS

Method not available.

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State of Illinois



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Fax: (312) 288-1101

ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82424

Sample Description: B-3-D; B-3
Suntec

Date Taken: 05-24-89 1150

Date Received: 05-24-89

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82425

Sample Description: B-4-E; B-4
Suntec

Date Taken: 05-24-89 1615

Date Received: 05-25-89 1445

Solids, Total

79.23

%

Results on a dry weight basis.

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82425

Sample Description: B-4-E; B-4
Suntec

Date Taken: 05-24-89 1615

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82425


Sample Description: B-4-E; B-4
Suntec

Date Taken: 05-24-89 1615

Date Received: 05-25-89 1445

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82426

Sample Description: B-2-E; B-2
Suntec

Date Taken: 05-25-89 0840

Date Received: 05-25-89 1445

Solids, Total

89.11

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82426

Sample Description: B-2-E; B-2
Suntec

Date Taken: 05-25-89 0840

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82426

Sample Description: B-2-E; B-2
Suntec

Date Taken: 05-25-89 0840

Date Received: 05-25-89 1445

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82427

Sample Description: B-6-D; B-6
Suntec

Date Taken: 05-25-89 1025

Date Received: 05-25-89 1445

Solids, Total

88.01

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82427

Sample Description: B-6-D; B-6
Suntec

Date Taken: 05-25-89 1025

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager

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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82427

Sample Description: B-6-D; B-6
Suntec

Date Taken: 05-25-89 1025

Date Received: 05-25-89 1445

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82428

Sample Description: B-5-E
Suntec

Date Taken: 05-24-89 1730

Date Received: 05-25-89 1445

Solids, Total

91.17

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82428

Sample Description: B-5-E
Suntec

Date Taken: 05-24-89 1730

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82428

Sample Description: B-5-E
Suntec

Date Taken: 05-24-89 1730

Date Received: 05-25-89 1445

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82429

Sample Description: MW-B3; B-3
Suntec

Date Taken: 05-25-89 1100

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	2.8	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
1,1-Dichloroethane	143.	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	1.6	ug/L
cis-1,2-Dichloroethene	318.	ug/L
trans-1,2-Dichloroethene	2.6	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	62.	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82429

Sample Description: MW-B3; B-3
Suntec

Date Taken: 05-25-89 1100

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	118.	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Isopropanol	<10.	mg/L


Neal E. Cleghorn
Project Manager

Radian Work Order 89-07-265

Analytical Report
09/06/89

ERM - North Central

ERM North Central
102 Wilmont Road
Deerfield, IL 60015

Customer Work Identification Suntec Industries
Purchase Order Number 9155

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Corporation
8501 MoPac Boulevard
Austin, Texas 78720-1088

512/454-4797

Client Services Coordinator: CSAPPLEGATE

Certified by:

Michael C. Stephens

ERM - North Central

Radian Work Order: 89-07-265

Method: SW8240-Illinois List (1)

List:

Sample ID:	SB1A	SB1B	SB1C	SB2A	SB2B	SB2C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	03A	04A	05A	06A	07A	08A
Matrix:	solid	solid	solid	solid	solid	solid

Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Hexane	<10	<10	<10	<10	<10	<10
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes	<15	<15	<15	<15	<15	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene	97	96	98	98	95	93
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	101	99	98	100	100
Control Limits: 91 to 110						
Toluene-d8	99	98	100	98	97	97
Control Limits: 91 to 103						

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-265

Method: SW8240-Illinois list (1)

List:

Sample ID:	SB3A	SB3B	SB3C	SB4A	SB4B	SB4C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	09A	10A	11A	12A	13A	14A
Matrix:	solid	solid	solid	solid	solid	solid

Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
n-Hexane	<10	<10	<10	<10	<10	<10
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes	<15	<15	<15	<15	<15	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene	92	98	96	97	99 Q	96
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	100	101	101	100	101	101
Control Limits: 91 to 110						
Toluene-d8	99	99	98	96	98	100
Control Limits: 91 to 103						

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-265

Method: SW8240-Illinois list (1)

List:

Sample ID: SYSTEM BLANK

Factor: 1.000

Results in: ug/Kg

16A

Matrix: solid

Benzene	<5.0
1,2-Dichloroethane	<5.0
Ethyl benzene	<5.0
n-Hexane	<10
Toluene	<5.0
Xylenes	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene 99 Q

Control Limits: 62 to 98

1,2-Dichloroethane-d4 100

Control Limits: 91 to 110

Toluene-d8 100

Control Limits: 91 to 103

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-265

Method: SW8240-Illinois list (1)

List:

Sample ID:	TSI	DECON I	SYSTEM BLANK
Factor:	5.000	1.000	1.00
Results in:	ug/L	ug/L	ug/L
	01A	02A	15A
Matrix:	water	water	water

Benzene	<25	<5.0	<5.0
1,2-Dichloroethane	<25	<5.0	<5.0
Ethyl benzene	<25	<5.0	<5.0
n-Hexane	<50	<10	<10
Toluene	<25	<5.0	<5.0
Xylenes	<u>1500</u>	<15	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene	157	97	99
Control Limits: 55 to 167			
1,2-Dichloroethane-d4	100	101	100
Control Limits: 39 to 156			
Toluene-d8	103	101	100
Control Limits: 58 to 146			

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radion Work Order: 89-07-265

Method: SW8240-Volatile Organics (1)

List: 8240 MATRIX SPIKE

Sample ID:	S848 MS	S848 MSD
Factor:	2.000	2.000
Results in:	%	%
	13C	13D
Matrix:	solid	solid

Benzene	<u>81</u>	<u>79</u>
Chlorobenzene	<u>105</u>	<u>102</u>
1,1-Dichloroethene	<u>62</u>	<u>60</u>
Toluene	<u>100</u>	<u>95</u>
Trichloroethene	<u>92</u>	<u>84</u>

Surrogate Recovery(%)

1,4-Bromofluorobenzene	96	98
Control Limits: 62 to 98		
1,2-Dichloroethane-d4	99	102
Control Limits: 91 to 110		
Toluene-d8	101	98
Control Limits: 91 to 103		

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB1A	SB1B	SB1C	SB2A	SB2B	SB2C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	03B	04B	05B	06B	07B	08B
Matrix:	solid	solid	solid	solid	solid	solid
<hr/>						
Acetone	<100	<100	<100	<100	<100	<100
Acrolein	<75	<75	<75	<75	<75	<75
Acrylonitrile	<25	<25	<25	<25	<25	<25
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	<10	<10	<10	<10	<10	<10
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	<10	<10	<10	<10	<10	<10
2-Chloroethyl vinyl ether	<10	<10	<10	<10	<10	<10
Chloroform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,4-Dichloro-2-butene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane	<5.0	<u>35</u>	<5.0	<5.0	<5.0	<u>10*</u>
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl methacrylate	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-Hexanone	<50	<50	<50	<50	<50	<50
Iodomethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl ethyl ketone	<100	<100	<100	<100	<100	<100
4-Methyl-2-pentanone(MIBK)	<50	<50	<50	<50	<50	<50

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radfan Work Order: 89-07-265

Sample Identifications and Dates

Sample ID	TSI	DECON 1	SB1A	SB1B	SB1C	SB2A
Date Sampled	07/24/89	07/25/89	07/24/89	07/24/89	07/24/89	07/24/89
Date Received	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89
Matrix	water	water	solid	solid	solid	solid
	01	02	03	04	05	06
SW8240-Illinois list						
Prepared			08/04/89	08/04/89	08/04/89	08/04/89
Analyzed			08/04/89	08/04/89	08/04/89	08/04/89
Analyst			MCL	MCL	MCL	MCL
File ID			74501	74502	74503	74504
Report as			received	received	received	received
SW8240-Illinois list						
Prepared	08/03/89	08/03/89				
Analyzed	08/03/89	08/03/89				
Analyst	MCL	MCL				
File ID	74485	74486				
Report as	received	received				
SW8240-Volatile Organics						
Prepared			08/04/89	08/04/89	08/04/89	08/04/89
Analyzed			08/04/89	08/04/89	08/04/89	08/04/89
Analyst			MCL	MCL	MCL	MCL
File ID			74501	74502	74503	74504
Report as			received	received	received	received
SW8240-Volatile Organics						
Prepared	08/03/89	08/03/89				
Analyzed	08/03/89	08/03/89				
Analyst	MCL	MCL				
File ID	74485	74486				
Report as	received	received				
SW8270-Illinois list						
Prepared			07/31/89	07/31/89	07/31/89	07/31/89
Analyzed			08/04/89	08/04/89	08/04/89	08/03/89
Analyst			MCK	MCK	MCK	MCK
File ID			82164	82157	82158	82151
Report as			received	received	received	received
SW8270-Illinois list						
Prepared		08/09/89				
Analyzed		08/23/89				
Analyst		MCK				
File ID		82282				
Report as		received				

ERM - North Central

Radian Work Order: 89-07-265

Method:SW8270-Illinois list (1)

List:

Sample ID:	DECON 1
Factor:	1.000
Results in:	ug/L
	02C
Matrix:	water

Acenaphthene	<1200
Acenaphthylene	<660
Anthracene	<660
Benzo(a)anthracene	<8.7
Benzo(a)pyrene	<15
Benzo(b)fluoranthene	<12
Benzo(g,h,i)perylene	<51
Benzo(k)fluoranthene	<11
Chrysene	<100
Dibenz(a,h)anthracene	<20
Fluoranthene	<140
Fluorene	<140
Indeno(1,2,3-cd)pyrene	<29
Naphthalene	<660
Phenanthrene	<660
Pyrene	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	71
Control Limits: 33 to 153	
2-Fluorophenol	48
Control Limits: 20 to 158	
Nitrobenzene-d5	50
Control Limits: 21 to 159	
Phenol-d5	51
Control Limits: 27 to 154	
Terphenyl-d14	102
Control Limits: 0 to 223	
2,4,6-Tribromophenol	93
Control Limits: 0 to 179	

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central
 Radian Work Order: 89-07-265

Sample Identifications and Dates

Sample ID	S82B	S82C	S83A	S83B	S83C	S84A
Date Sampled	07/24/89	07/24/89	07/24/89	07/24/89	07/24/89	07/24/89
Date Received	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89
Matrix	solid	solid	solid	solid	solid	solid
	07	08	09	10	11	12

SW8240-Illinois list

Prepared	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89
Analyzed	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89
Analyst	MCL	MCL	MCL	MCL	MCL	MCL
File ID	74505	74506	74507	74508	74509	74510
Report as	received	received	received	received	received	received

SW8240-Volatile Organics

Prepared	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89
Analyzed	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89
Analyst	MCL	MCL	MCL	MCL	MCL	MCL
File ID	74505	74506	74507	74508	74509	74510
Report as	received	received	received	received	received	received

W8270-Illinois list

Prepared	07/31/89	07/31/89	08/01/89	07/31/89	07/31/89	07/31/89
Analyzed	08/03/89	08/04/89	08/04/89	08/04/89	08/04/89	08/04/89
Analyst	MCK	MCK	MCK	MCK	MCK	MCK
File ID	82152	82159	82163	82160		82167
Report as	received	received	received	received	received	received

ERM - North Central
Radian Work Order: 89-07-265

Sample Identifications and Dates

Sample ID	SB4B	SB4C	SYSTEM BLANK	SYSTEM BLANK	REAGENT BLANK
Date Sampled	07/24/89	07/24/89			
Date Received	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89
Matrix	solid	solid	water	solid	solid
	13	14	15	16	18

SW8240-Illinois list

Prepared	08/04/89	08/04/89		08/04/89	
Analyzed	08/04/89	08/04/89		08/04/89	
Analyst	MCL	MCL		MCL	
File ID	74511	74514		74500	
Report as	received	received		received	

SW8240-Illinois list

Prepared			08/04/89		
Analyzed			08/04/89		
Analyst			MCL		
File ID			74500		
Report as			received		

SW8240-Volatile Organics

Prepared	08/05/89				
Analyzed	08/05/89				
Analyst	MCL				
File ID	74519				
Report as	received				

SW8240-Volatile Organics

Prepared	08/04/89	08/04/89		08/04/89	
Analyzed	08/04/89	08/04/89		08/04/89	
Analyst	MCL	MCL		MCL	
File ID	74511	74514		74500	
Report as	received	received		received	

SW8240-Volatile Organics

Prepared			08/04/89		
Analyzed			08/04/89		
Analyst			MCL		
File ID			74500		
Report as			received		

SW8270-Illinois list

Prepared	07/31/89	07/31/89			07/31/89
Analyzed	08/04/89	08/04/89			08/04/89
Analyst	MCK	MCK			MCK
File ID	82166	82162			82150
Report as	received	received			received

Appendix A

Comments, Notes and Definitions

ERM - North Central

Radian Work Order: 89-07-265

- A This flag indicates that a spike is an analytical and/or post-digestion spike. These spikes have not been subjected to the extraction or digestion step.
- B This flag indicates that the analyte was detected in the reagent blank but the sample results are not corrected for the amount in the blank.
- C Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The C flag indicates that the analyte has been confirmed by analysis on a second column.
- D This flag identifies all analytes identified in analysis at a secondary dilution factor. In an analysis some compounds can exceed the calibration range of the instrument. Therefore two analyses are performed, one at the concentration of the majority of the analytes, and a second with the sample diluted so that high concentration analyte(s) fall within the calibration range.
- E The reported value is estimated because of the presence of interference. The potential source of the interference is included in the report narrative.
- G This flag identifies a GC/MS result whose concentration exceeds the calibration range for that specific analysis. Usually if one or more compounds have a response greater than full scale, the sample or extract is diluted and re-analyzed.
- J Indicates an estimated value for GC/MS data. This flag is used either when estimating a concentration for tentatively identified compounds where a response factor of 1 is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.
- NA This analyte was not analyzed.
- NC Applies to RPD and spike recovery results. The relative percent difference (RPD) and spike recovery are not calculated when a result value is less than five times the detection limit or obvious matrix interferences are present. See * definition for further explanation of the unreliability of data near the detection limit. A spike recovery is not calculated when the sample result is greater than four times the spike added concentration because the spike added concentration is considered insignificant.
- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- NR This analyte was not requested by the client.
- NS This analyte or surrogate was not added (spiked) to the sample for this analysis.

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N/A A result or value is not available for this parameter, usually a detection limit.

P Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The P flag indicates that the analyte has been confirmed previously. This flag is applicable to analyses of samples arising from a regular sampling program as a specific sample source; for example, a quarterly well monitoring program.

Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

R This flag indicates that the analyte was detected in the reagent blank and the sample results are corrected for the amount in the blank.

S This flag indicates that a specific result from a metals analysis has been obtained using the Method of Standard Addition.

U Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The U flag indicates that second column was not requested.

X Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The X flag indicates a second column confirmation was performed but the analyte was not confirmed and is likely a false positive.

* The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

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TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup.
(Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/Kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order 89-07-266

Analytical Report
09/06/89

ERM - North Central

ERM North Central
102 Wilmont Road
Deerfield, IL 60015

Customer Work Identification Suntec Industries
Purchase Order Number 9155

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Corporation
8501 MoPac Boulevard
Austin, Texas 78720-1088

512/454-4797

Client Services Coordinator: CSAPPLEGATE

Certified by:

Michael C. Supt

ERM - North Central
 Radian Work Order: 89-07-266

Method: SW8240-Illinois list (1)

List:

Sample ID:	S85A	S85B	S85C	S86A	S86B	S86C
Factor:	10.000	100.000	100.000	10.000	10.000	50.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	01A	02A	03A	04A	05A	06A
Matrix:	solid	solid	solid	solid	solid	solid
Benzene	<50	<500	<500	<50	<50	<250
1,2-Dichloroethane	<50	<500	<500	<50	<50	<250
Ethyl benzene	<50	<u>780*</u>	<500	<50	<u>97*</u>	<u>710*</u>
n-Hexane	<100	<1000	<1000	<100	<100	<500
Toluene	<50	<u>650*</u>	<500	<50	<50	<u>250*</u>
Xylenes	<150	<u>8000</u>	<1500	<150	<u>1100</u>	<u>6600</u>

Surrogate Recovery(%)

1,4-Bromofluorobenzene	100 Q	129 Q	101 Q	99 Q	226 Q	195 Q
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	103	100	101	98	100
Control Limits: 91 to 110						
Toluene-d8	103	99	102	104 Q	98	99
Control Limits: 91 to 103						

Q Outside control limits

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-266

Method: SW8240-Illinois list (1)

List:

Sample ID:	S87A	S87B	S88A	S88B	S88C	S89A
Factor:	100.000	100.000	100.000	50.000	100.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	07A	08A	09A	10A	11A	12A
Matrix:	solid	solid	solid	solid	solid	solid

Benzene	<500	<500	<500	<250	<500	<5.0
1,2-Dichloroethane	<500	<500	<500	<250	<500	<5.0
Ethyl benzene	<500	<500	<500	<250	<500	<5.0
n-Hexane	<1000	<1000	<1000	<500	<1000	<10
Toluene	<500	<500	<500	560*	<500	<5.0
Xylenes	22000	9800	<1500	9000	3200*	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene	236 Q	206 Q	93	226 Q	144 Q	99 Q
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	99	101	94	91	102
Control Limits: 91 to 110						
Toluene-d8	101	102	100	99	99	101
Control Limits: 91 to 103						

Q Outside control limits

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-266

Method:SW8240-Illinois list (1)

List:

Sample ID:	SB9B	SB9C	SYSTEM BLANK
Factor:	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg
	13A	14A	15A
Matrix:	solid	solid	solid

Benzene	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0
n-Hexane	<10	<10	<10
Toluene	<5.0	<5.0	<5.0
Xylenes	<15	<15	<15

Surrogate Recovery(%)

1,4-Bromofluorobenzene	99 Q	98	94
Control Limits: 62 to 98			
1,2-Dichloroethane-d4	100	102	97
Control Limits: 91 to 110			
Toluene-d8	96	99	104 Q
Control Limits: 91 to 103			

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radon Work Order: 89-07-266

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB5A	SB5B	SB5C	SB6A	SB6B	SB6C
Factor:	10.000	100.000	100.000	10.000	10.000	50.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	01B	02B	03B	04B	05B	06B
Matrix:	solid	solid	solid	solid	solid	solid
Acetone	<1000	<10000	<10000	<1000	<1000	<5000
Acrolein	<750	<7500	<7500	<750	<750	<3800
Acrylonitrile	<250	<2500	<2500	<250	<250	<1300
Benzene	<50	<500	<500	<50	<50	<250
Bromodichloromethane	<50	<500	<500	<50	<50	<250
Bromomethane	<100	<1000	<1000	<100	<100	<500
Carbon disulfide	<50	<500	<500	<50	<50	<250
Carbon tetrachloride	<50	<500	<500	<50	<50	<250
Chlorobenzene	<50	<500	<500	<50	<50	<250
Chloroethane	<100	<1000	<1000	<100	<100	<500
2-Chloroethyl vinyl ether	<100	<1000	<1000	<100	<100	<500
Chloroform	<50	<500	<500	<50	<50	<250
Chloromethane	<100	<1000	<1000	<100	<100	<500
Dibromochloromethane	<50	<500	<500	<50	<50	<250
Dibromomethane	<50	<500	<500	<50	<50	<250
trans-1,4-Dichloro-2-butene	<50	<500	<500	<50	<50	<250
Dichlorodifluoromethane	<50	<u>3300</u>	<500	<50	<50	<250
1,1-Dichloroethane	<50	<500	<500	<50	<50	<250
1,2-Dichloroethane	<50	<500	<500	<50	<50	<250
1,1-Dichloroethene	<50	<500	<500	<50	<50	<250
trans-1,2-Dichloroethene	<50	<500	<500	<50	<50	<250
1,2-Dichloropropane	<50	<500	<500	<50	<50	<250
cis-1,3-Dichloropropene	<50	<500	<500	<50	<50	<250
trans-1,3-Dichloropropene	<50	<500	<500	<50	<50	<250
Ethyl benzene	<50	<500	<500	<50	<u>97*</u>	<u>700*</u>
Ethyl methacrylate	<50	<500	<500	<50	<50	<250
2-Hexanone	<500	<5000	<5000	<500	<500	<2500
Iodomethane	<50	<500	<500	<50	<50	<250
Methyl ethyl ketone	<1000	<10000	<10000	<1000	<1000	<5000
4-Methyl-2-pentanone(MIBK)	<500	<5000	<5000	<500	<500	<2500

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radon Work Order: 89-07-266

Method: SW8240-Volatile Organics (1)

List: 8240 Table 1

Sample ID:	S85A	S85B	S85C	S86A	S86B	S86C
Factor:	10.000	100.000	100.000	10.000	10.000	50.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	018	028	038	048	058	068
Matrix:	solid	solid	solid	solid	solid	solid
Methylene chloride	<50	<500	<500	<50	<50	<250
Styrene	<50	<500	<500	<50	<50	<250
1,1,2,2-Tetrachloroethane	<50	<500	<500	<50	<50	<250
Tetrachloroethene	<50	<u>2500</u>	<500	<50	<u>280</u>	<u>1600</u>
Toluene	<50	<500	<500	<50	<50	<u>250*</u>
Tribromomethane(Bromoform)	<50	<500	<500	<50	<50	<250
1,1,1-Trichloroethane	<50	<u>6200</u>	<500	<50	<u>54*</u>	<u>1400</u>
1,1,2-Trichloroethane	<50	<500	<500	<50	<50	<250
Trichloroethene	<50	<u>3800</u>	<500	<50	<50	<250
Trichlorofluoromethane	<50	<500	<500	<50	<50	<250
1,2,3-Trichloropropane	<50	<500	<500	<50	<50	<250
Vinyl acetate	<50	<500	<500	<50	<50	<250
Vinyl chloride	<100	<1000	<1000	<100	<100	<500
Xylenes	<50	<u>8000</u>	<500	<50	<u>1100</u>	<u>6600</u>

Surrogate Recovery(%)

1,4-Bromofluorobenzene	100 q	129 q	101 q	99 q	226 q	195 q
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	103	100	101	98	99
Control Limits: 91 to 110						
Toluene-d8	103	99	102	104 q	98	99
Control Limits: 91 to 103						

q Outside control limits

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
 Radian Work Order: 89-07-266

Method: SW8240-Volatile Organics (1)

List: 8240 Table 1

Sample ID:	S87A	S87B	S88A	S88B	S88C	S89A
Factor:	100.000	100.000	100.000	50.000	100.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	07B	08B	09B	10B	11B	12B
Matrix:	solid	solid	solid	solid	solid	solid
Acetone	<10000	<10000	<10000	<5000	<10000	<100
Acrolein	<7500	<7500	<7500	<3800	<7500	<75
Acrylonitrile	<2500	<2500	<2500	<1300	<2500	<25
Benzene	<500	<500	<500	<250	<500	<5.0
Bromodichloromethane	<500	<500	<500	<250	<500	<5.0
Bromomethane	<1000	<1000	<1000	<500	<1000	<10
Carbon disulfide	<500	<500	<500	<250	<500	<5.0
Carbon tetrachloride	<500	<500	<500	<250	<500	<5.0
Chlorobenzene	<500	<500	<500	<250	<500	<5.0
Chloroethane	<1000	<1000	<1000	<500	<1000	<10
2-Chloroethyl vinyl ether	<1000	<1000	<1000	<500	<1000	<10
Chloroform	<500	<500	<500	<250	<500	<5.0
Chloromethane	<1000	<1000	<1000	<500	<1000	<10
Dibromochloromethane	<500	<500	<500	<250	<500	<5.0
Dibromomethane	<500	<500	<500	<250	<500	<5.0
trans-1,4-Dichloro-2-butene	<500	<500	<500	<250	<500	<5.0
Dichlorodifluoromethane	<500	<500	<500	<250	<500	<5.0
1,1-Dichloroethane	<500	<500	<500	<250	<500	<5.0
1,2-Dichloroethane	<500	<500	<500	<250	<500	<5.0
1,1-Dichloroethene	<500	<500	<500	<250	<500	<5.0
trans-1,2-Dichloroethene	<500	<500	<500	<250	<500	<5.0
1,2-Dichloropropane	<500	<500	<500	<250	<500	<5.0
cis-1,3-Dichloropropene	<500	<500	<500	<250	<500	<5.0
trans-1,3-Dichloropropene	<500	<500	<500	<250	<500	<5.0
Ethyl benzene	<500	<500	<500	<250	<500	<5.0
Ethyl methacrylate	<500	<500	<500	<250	<500	<5.0
2-Hexanone	<5000	<5000	<5000	<2500	<5000	<50
Iodomethane	<500	<500	<500	<250	<500	<5.0
Methyl ethyl ketone	<10000	<10000	<10000	<5000	<10000	<100
4-Methyl-2-pentanone(MIBK)	<5000	<5000	<5000	<2500	<5000	<50

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
 Radian Work Order: 89-07-266

Method: SW8240-Volatile Organics (1)

List: 8240 Table 1

Sample ID:	S87A	S87B	S88A	S88B	S88C	S89A
Factor:	100.000	100.000	100.000	50.000	100.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	07B	08B	09B	10B	11B	12B
Matrix:	solid	solid	solid	solid	solid	solid

Methylene chloride	<500	<500	<500	<250	<500	<5.0
Styrene	<500	<500	<500	<250	<500	<5.0
1,1,2,2-Tetrachloroethane	<500	<500	<500	<250	<500	<5.0
Tetrachloroethene	<500	<500	<500	<250	1500*	<5.0
Toluene	<500	<500	<500	550*	<500	<5.0
Tribromomethane(Bromoform)	<500	<500	<500	<250	<500	<5.0
1,1,1-Trichloroethane	<500	<500	<500	<250	<500	<5.0
1,1,2-Trichloroethane	<500	<500	<500	<250	<500	<5.0
Trichloroethene	<500	<500	<500	<250	<500	<5.0
Trichlorofluoromethane	<500	<500	<500	<250	<500	<5.0
1,2,3-Trichloropropane	<500	<500	<500	<250	<500	<5.0
Vinyl acetate	<500	<500	<500	<250	<500	<5.0
Vinyl chloride	<1000	<1000	<1000	<500	<1000	<10
Xylenes	22,000	9800	<500	9000	3200	<5.0

Surrogate Recovery(%)

1,4-Bromofluorobenzene	236 Q	206 Q	93	226 Q	144 Q	99 Q
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	99	101	94	91	102
Control Limits: 91 to 110						
Toluene-d8	101	102	100	99	99	101
Control Limits: 91 to 103						

Q Outside control limits

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
 Radian Work Order: 89-07-266

 Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB9A	SB9C	SYSTEM BLANK
Factor:	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg
	138	148	158
Matrix:	solid	solid	solid

Acetone	<100	<100	<100
Acrolein	<75	<75	<75
Acrylonitrile	<25	<25	<25
Benzene	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0
Bromomethane	<10	<10	<10
Carbon disulfide	<5.0	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	<5.0	<5.0
Chloroethane	<10	<10	<10
2-Chloroethyl vinyl ether	<10	<10	<10
Chloroform	<5.0	<5.0	<5.0
Chloromethane	<10	<10	<10
Dibromochloromethane	<5.0	<5.0	<5.0
Dibromomethane	<5.0	<5.0	<5.0
trans-1,4-Dichloro-2-butene	<5.0	<5.0	<5.0
Dichlorodifluoromethane	<5.0	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0
Ethyl methacrylate	<5.0	<5.0	<5.0
2-Hexanone	<50	<50	<50
Iodomethane	<5.0	<5.0	<5.0
Methyl ethyl ketone	<100	<100	<100
4-Methyl-2-pentanone(MIBK)	<50	<50	<50

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(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
 Radian Work Order: 89-07-266

 Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB9A	SB9C	SYSTEM BLANK
Factor:	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg
	13B	14B	15B
Matrix:	solid	solid	solid

Methylene chloride	<5.0	<5.0	<5.0
Styrene	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0
Tetrachloroethene	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0
Tri bromomethane(Bromoform)	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0
Trichlorofluoromethane	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0
Vinyl acetate	<5.0	<5.0	<5.0
Vinyl chloride	<10	<10	<10
Xylenes	<5.0	<5.0	<5.0

Surrogate Recovery(%)

1,4-Bromofluorobenzene	98	98	94
Control Limits: 62 to 98			
1,2-Dichloroethane-d4	100	102	97
Control Limits: 91 to 110			
Toluene-d8	96	99	104 a
Control Limits: 91 to 103			

a Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-266

Method: SW8270-Illinois list (1)

List:

Sample ID:	SB5A	SB5B	SB5C	SB6A	SB6B	SB6C
Factor:	3.000	1.000	1.000	3.000	1.000	1.000
Results in:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	01B	02B	03B	04B	05B	06B
Matrix:	solid	solid	solid	solid	solid	solid
Acenaphthene	<3600	<1200	<1200	<3600	<1200	<1200
Acenaphthylene	<2000	<660	<660	<2000	<660	<660
Anthracene	<2000	<660	<660	<2000	<660	<660
Benzo(a)anthracene	<26	<u>54</u>	<u>61</u>	<u>140</u>	<u>70</u>	<u>17*</u>
Benzo(a)pyrene	<45	<15	<15	<u>63*</u>	<u>32*</u>	<15
Benzo(b)fluoranthene	<36	<12	<u>21*</u>	<u>140*</u>	<u>40*</u>	<12
Benzo(g,h,i)perylene	<150	<51	<51	<150	<51	<51
Benzo(k)fluoranthene	<33	<11	<11	<u>100*</u>	<u>32*</u>	<11
Chrysene	<300	<100	<100	<300	<100	<100
Dibenz(a,h)anthracene	<60	<20	<20	<60	<20	<20
Fluoranthene	<420	<140	<140	<u>660*</u>	<u>280*</u>	<140
Fluorene	<420	<140	<u>690*</u>	<420	<140	<140
Indeno(1,2,3-cd)pyrene	<87	<29	<29	<87	<29	<29
Naphthalene	<2000	<660	<u>1100*</u>	<2000	<u>800*</u>	<660
Phenanthrene	<2000	<660	<u>1200*</u>	<2000	<660	<660
Pyrene	<540	<180	<u>210*</u>	<u>800*</u>	<u>250*</u>	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	100	105	108	117	106	80
Control Limits: 33 to 153						
2-Fluorophenol	93	95	107	102	99	51
Control Limits: 20 to 158						
Nitrobenzene-d5	83	88	91	89	93	48
Control Limits: 21 to 159						
Phenol-d5	90	94	94	92	98	61
Control Limits: 27 to 154						
Terphenyl-d14	86	79	136	115	77	80
Control Limits: 0 to 223						
2,4,6-Tribromophenol	95	91	84	82	96	89
Control Limits: 0 to 179						

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central
Radian Work Order: 89-07-266

Method:SW8270-Illinois list (1)

List:						
Sample ID:	S87A	S87B	S88A	S88B	S88C	S89A
Factor:	3.000	3.000	3.000	3.000	3.000	3.000
Results in:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	078	088	098	108	118	128
Matrix:	solid	solid	solid	solid	solid	solid
Acenaphthene	<3600	<3600	<3600	<3600	<3600	<3600
Acenaphthylene	<2000	<2000	<2000	<2000	<2000	<2000
Anthracene	<2000	<2000	<2000	<2000	<2000	<2000
Benzo(a)anthracene	150	38*	<26	39*	<26	110*
Benzo(a)pyrene	69*	<45	<45	<45	<45	100*
Benzo(b)fluoranthene	81*	<36	<36	<36	<36	91*
Benzo(g,h,i)perylene	<150	<150	<150	<150	<150	<150
Benzo(k)fluoranthene	82*	<33	<33	<33	<33	79*
Chrysene	<300	<300	<300	<300	<300	<300
Dibenz(a,h)anthracene	<60	<60	<60	<60	<60	<60
Fluoranthene	<420	<420	<420	<420	<420	<420
Fluorene	<420	<420	<420	<420	<420	<420
Indeno(1,2,3-cd)pyrene	<87	<87	<87	<87	<87	<87
Naphthalene	2500*	<2000	<2000	<2000	<2000	<2000
Phenanthrene	<2000	<2000	<2000	<2000	<2000	<2000
Pyrene	<540	<540	<540	<540	<540	<540

Surrogate Recovery(%)

2-Fluorobiphenyl	102	104	86	101	85	88
Control Limits: 33 to 153						
2-Fluorophenol	94	82	83	77	66	85
Control Limits: 20 to 158						
Nitrobenzene-d5	82	78	84	80	64	89
Control Limits: 21 to 159						
Phenol-d5	84	80	80	82	70	76
Control Limits: 27 to 154						
Terphenyl-d14	81	81	86	73	86	88
Control Limits: 0 to 223						
2,4,6-Tribromophenol	77	85	99	95	93	91
Control Limits: 0 to 179						

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central

Radian Work Order: 89-07-266

Method: SW8270-Illinois list (1)

List:

Sample ID:	SB9A	SB9C	REAGENT BLANK
Factor:	1.000	1.000	1.000
Results in:	ug/kg	ug/kg	ug/kg
	13B	14B	16A
Matrix:	solid	solid	solid

Acenaphthene	<1200	<1200	<1200
Acenaphthylene	<660	<660	<660
Anthracene	<660	<660	<660
Benzo(a)anthracene	<8.7	<8.7	<8.7
Benzo(a)pyrene	<15	<15	<15
Benzo(b)fluoranthene	<12	<12	<12
Benzo(g,h,i)perylene	<51	<51	<51
Benzo(k)fluoranthene	<11	<11	<11
Chrysene	<100	<100	<100
Dibenz(a,h)anthracene	<20	<20	<20
Fluoranthene	<140	<140	<140
Fluorene	<140	<140	<140
Indeno(1,2,3-cd)pyrene	<29	<29	<29
Naphthalene	<660	<660	<660
Phenanthrene	<660	<660	<660
Pyrene	<180	<180	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	88	81	92
Control Limits: 33 to 153			
2-Fluorophenol	81	80	83
Control Limits: 20 to 158			
Nitrobenzene-d5	79	77	80
Control Limits: 21 to 159			
Phenol-d5	81	78	83
Control Limits: 27 to 154			
Terphenyl-d14	94	86	90
Control Limits: 0 to 223			
2,4,6-Tribromophenol	95	85	96
Control Limits: 0 to 179			

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central

Radian Work Order: 89-07-266

Method:SW8270-Semi-Volatiles (1)

List:Matrix Spike List

Sample ID:	SB7A MS	SB7A MSD
Factor:	0.0	0.0
Results in:	%	%
	07C	07D
Matrix:	solid	solid

Acenaphthene	84	86
4-Chloro-3-methylphenol	122	114
2-Chlorophenol	92	92
1,4-Dichlorobenzene	92	91
2,4-Dinitrotoluene	108	110
N-Nitrosodipropylamine	101	101
4-Nitrophenol	111	116
Pentachlorophenol	114	121
Phenol	94	94
Pyrene	134	135
1,2,4-Trichlorobenzene	86	92

Surrogate Recovery(%)

2-Fluorophenol	112	106
Control Limits: 20 to 158		
Phenol-d5	118	115
Control Limits: 27 to 154		
Nitrobenzene-d5	91	106
Control Limits: 21 to 159		
2-Fluorobiphenyl	131	131
Control Limits: 33 to 153		
2,4,6-Tribromophenol	83	84
Control Limits: 0 to 179		
Terphenyl-d14	84	86
Control Limits: 0 to 223		

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-266

Sample Identifications and Dates

Sample ID	SB7A	SB7B	SB8A	SB8B	SB8C	SB9A
Date Sampled	07/25/89	07/25/89	07/25/89	07/25/89	07/25/89	07/25/89
Date Received	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89	07/27/89
Matrix	solid	solid	solid	solid	solid	solid
	07	08	09	10	11	12

SW8240-Illinois list

Prepared	08/03/89	08/03/89	08/03/89	08/07/89	08/07/89	08/04/89
Analyzed	08/03/89	08/03/89	08/03/89	08/07/89	08/07/89	08/04/89
Analyst	MCL	MCL	MCL	MCL	MCL	MCL
File ID	74489	74490	74491	74528	74529	74515
Report as	received	received	received	received	received	received

SW8240-Volatile Organics

Prepared	08/03/89	08/03/89	08/03/89	08/07/89	08/07/89	08/04/89
Analyzed	08/03/89	08/03/89	08/03/89	08/07/89	08/07/89	08/04/89
Analyst	MCL	MCL	MCL	MCL	MCL	MCL
File ID	74489	74490	74491	74528	74529	74515
Report as	received	received	received	received	received	received

8270-Illinois list

Prepared	08/02/89	08/02/89	08/02/89	08/02/89	08/02/89	08/02/89
Analyzed	08/08/89	08/08/89	08/07/89	08/07/89	08/07/89	08/08/89
Analyst	MCK	MCK	MCK	MCK	MCK	MCK
File ID	82188	82185	82177	82176	82180	82187
Report as	received	received	received	received	received	received

8270-Semi-Volatiles

Prepared	08/02/89
Analyzed	08/08/89
Analyst	MCK
File ID	82190
Report as	received

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Sample Identifications and Dates

Sample ID	SB9B	SB9C	SYSTEM BLANK	REAGENT BLANK
Date Sampled	07/25/89	07/25/89		
Date Received	07/27/89	07/27/89	07/27/89	07/27/89
Matrix	solid	solid	solid	solid
	13	14	15	16

SW8240-Illinois list

Prepared	08/04/89	08/05/89	08/03/89
Analyzed	08/04/89	08/05/89	08/03/89
Analyst	MCL	MCL	MCL
File ID	74516	74517	74477
Report as	received	received	received

SW8240-Volatile Organics

Prepared	08/04/89	08/05/89	08/03/89
Analyzed	08/04/89	08/05/89	08/03/89
Analyst	MCL	MCL	MCL
File ID	74516	74517	74477
Report as	received	received	received

8270-Illinois list

Prepared	08/02/89	08/02/89	08/02/89
Analyzed	08/07/89	08/07/89	08/07/89
Analyst	MCK	MCK	MCK
File ID	82172	82174	82171
Report as	received	received	received

Appendix A

Comments, Notes and Definitions

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- A This flag indicates that a spike is an analytical and/or post-digestion spike. These spikes have not been subjected to the extraction or digestion step.
- B This flag indicates that the analyte was detected in the reagent blank but the sample results are not corrected for the amount in the blank.
- C Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The C flag indicates that the analyte has been confirmed by analysis on a second column.
- D This flag identifies all analytes identified in analysis at a secondary dilution factor. In an analysis some compounds can exceed the calibration range of the instrument. Therefore two analyses are performed, one at the concentration of the majority of the analytes, and a second with the sample diluted so that high concentration analyte(s) fall within the calibration range.
- E The reported value is estimated because of the presence of interference. The potential source of the interference is included in the report narrative.
- G This flag identifies a GC/MS result whose concentration exceeds the calibration range for that specific analysis. Usually if one or more compounds have a response greater than full scale, the sample or extract is diluted and re-analyzed.
- J Indicates an estimated value for GC/MS data. This flag is used either when estimating a concentration for tentatively identified compounds where a response factor of 1 is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.
- NA This analyte was not analyzed.
- NC Applies to RPD and spike recovery results. The relative percent difference (RPD) and spike recovery are not calculated when a result value is less than five times the detection limit or obvious matrix interferences are present. See * definition for further explanation of the unreliability of data near the detection limit. A spike recovery is not calculated when the sample result is greater than four times the spike added concentration because the spike added concentration is considered insignificant.
- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- NR This analyte was not requested by the client.
- NS This analyte or surrogate was not added (spiked) to the sample for this analysis.

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- N/A A result or value is not available for this parameter, usually a detection limit.
- P Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The P flag indicates that the analyte has been confirmed previously. This flag is applicable to analyses of samples arising from a regular sampling program as a specific sample source; for example, a quarterly well monitoring program.
- Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.
- R This flag indicates that the analyte was detected in the reagent blank and the sample results are corrected for the amount in the blank.
- S This flag indicates that a specific result from a metals analysis has been obtained using the Method of Standard Addition.
- U Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The U flag indicates that second column was not requested.
- X Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The X flag indicates a second column confirmation was performed but the analyte was not confirmed and is likely a false positive.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

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TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup.
(Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/Kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

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 Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB1A	SB1B	SB1C	SB2A	SB2B	SB2C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	038	048	058	068	078	088
Matrix:	solid	solid	solid	solid	solid	solid
Methylene chloride	12*	11*	12*	<5.0	<5.0	11*
Styrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tribromomethane(Bromoform)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl acetate	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	<10	<10	<10	<10	<10	<10
Xylenes	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

 Surrogate Recovery(%)

1,4-Bromofluorobenzene	97	96	98	98	95	93
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	101	101	99	98	100	100
Control Limits: 91 to 110						
Toluene-d8	99	98	100	98	97	97
Control Limits: 91 to 103						

 * Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radon Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB3A	SB3B	SB3C	SB4A	SB4B	SB4C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	098	108	118	128	138	148
Matrix:	solid	solid	solid	solid	solid	solid
Acetone	<100	<100	<100	<100	<100	<100
Acrolein	<75	<75	<75	<75	<75	<75
Acrylonitrile	<25	<25	<25	<25	<25	<25
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	<10	<10	<10	<10	<10	<10
Carbon disulfide	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	<10	<10	<10	<10	<10	<10
2-Chloroethyl vinyl ether	<10	<10	<10	<10	<10	<10
Chloroform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,4-Dichloro-2-butene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorodifluoromethane	<u>8.9*</u>	<5.0	<u>8.9*</u>	<u>11*</u>	<u>18*</u>	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethyl methacrylate	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-Hexanone	<50	<50	<50	<50	<50	<50
Iodomethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methyl ethyl ketone	<100	<100	<100	<100	<100	<100
4-Methyl-2-pentanone(MIBK)	<50	<50	<50	<50	<50	<50

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	SB3A	SB3B	SB3C	SB4A	SB4B	SB4C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
	098	108	118	128	138	148
Matrix:	solid	solid	solid	solid	solid	solid
Methylene chloride	9.7*	<5.0	<5.0	<5.0	<5.0	<5.0
Styrene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tribromomethane(Bromoform)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	<5.0	<5.0	<5.0	12*	<5.0	<5.0
1,2,3-Trichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl acetate	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl chloride	<10	<10	<10	<10	<10	<10
Xylenes	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Surrogate Recovery(%)

1,4-Bromofluorobenzene	92	98	96	97	98	96
Control Limits: 62 to 98						
1,2-Dichloroethane-d4	100	101	101	100	101	101
Control Limits: 91 to 110						
Toluene-d8	99	99	98	96	98	100
Control Limits: 91 to 103						

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID: SYSTEM BLANK

Factor: 1.000

Results in: ug/Kg

168

Matrix: solid

Acetone	<100
Acrolein	<75
Acrylonitrile	<25
Benzene	<5.0
Bromodichloromethane	<5.0
Bromomethane	<10
Carbon disulfide	<5.0
Carbon tetrachloride	<5.0
Chlorobenzene	<5.0
Chloroethane	<10
2-Chloroethyl vinyl ether	<10
Chloroform	<5.0
Chloromethane	<10
Dibromochloromethane	<5.0
Dibromomethane	<5.0
trans-1,4-Dichloro-2-butene	<5.0
Dichlorodifluoromethane	<5.0
1,1-Dichloroethane	<5.0
1,2-Dichloroethane	<5.0
1,1-Dichloroethene	<5.0
trans-1,2-Dichloroethene	<5.0
1,2-Dichloropropane	<5.0
cis-1,3-Dichloropropene	<5.0
trans-1,3-Dichloropropene	<5.0
Ethyl benzene	<5.0
Ethyl methacrylate	<5.0
2-Hexanone	<50
Iodomethane	<5.0
Methyl ethyl ketone	<100
4-Methyl-2-pentanone(MIBK)	<50

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-265

Method: SW8240-Volatile Organics (1)

List: 8240 Table 1

Sample ID: SYSTEM BLANK

Factor: 1.000

Results in: ug/Kg

168

Matrix: solid

Methylene chloride	<5.0
Styrene	<5.0
1,1,2,2-Tetrachloroethane	<5.0
Tetrachloroethene	<5.0
Toluene	<5.0
Tribromomethane(Bromoform)	<5.0
1,1,1-Trichloroethane	<5.0
1,1,2-Trichloroethane	<5.0
Trichloroethene	<5.0
Trichlorofluoromethane	<5.0
1,2,3-Trichloropropane	<5.0
Vinyl acetate	<5.0
Vinyl chloride	<10
Xylenes	<5.0

Surrogate Recovery(%)

1,4-Bromofluorobenzene 99 Q

Control Limits: 62 to 98

1,2-Dichloroethane-d4 100

Control Limits: 91 to 110

Toluene-d8 100

Control Limits: 91 to 103

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	TS1	DECON 1	SYSTEM BLANK
Factor:	5.000	1.000	1.000
Results in:	ug/L	ug/L	ug/L
	01B	02B	15B
Matrix:	water	water	water

Acetone	<500	<100	<100
Acrolein	<380	<75	<75
Acrylonitrile	<130	<25	<25
Benzene	<25	<5.0	<5.0
Bromodichloromethane	<25	<5.0	<5.0
Bromomethane	<50	<10	<10
Carbon disulfide	<25	<5.0	<5.0
Carbon tetrachloride	<25	<5.0	<5.0
Chlorobenzene	<25	<5.0	<5.0
Chloroethane	<50	<10	<10
2-Chloroethyl vinyl ether	<50	<10	<10
Chloroform	<25	<5.0	<5.0
Chloromethane	<50	<10	<10
Dibromochloromethane	<25	<5.0	<5.0
Dibromomethane	<25	<5.0	<5.0
trans-1,4-Dichloro-2-butene	<25	<5.0	<5.0
Dichlorodifluoromethane	<25	<5.0	<5.0
1,1-Dichloroethane	<25	<5.0	<5.0
1,2-Dichloroethane	<25	<5.0	<5.0
1,1-Dichloroethene	<25	<5.0	<5.0
trans-1,2-Dichloroethene	<25	<5.0	<5.0
1,2-Dichloropropane	<25	<5.0	<5.0
cis-1,3-Dichloropropene	<25	<5.0	<5.0
trans-1,3-Dichloropropene	<25	<5.0	<5.0
Ethyl benzene	<25	<5.0	<5.0
Ethyl methacrylate	<25	<5.0	<5.0
2-Hexanone	<250	<50	<50
Iodomethane	<25	<5.0	<5.0
Methyl ethyl ketone	<500	95*	<100
4-Methyl-2-pentanone(MIBK)	<250	<50	<50

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central
Radian Work Order: 89-07-265

Method:SW8240-Volatile Organics (1)

List:8240 Table 1

Sample ID:	TSI	DECON 1	SYSTEM BLANK
Factor:	5.000	1.000	1.000
Results in:	ug/L	ug/L	ug/L
	018	028	158
Matrix:	water	water	water

Methylene chloride	<u>670</u>	<5.0	<5.0
Styrene	<25	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<25	<5.0	<5.0
Tetrachloroethene	<25	<5.0	<5.0
Toluene	<25	<5.0	<5.0
Tribromomethane(Bromoform)	<25	<5.0	<5.0
1,1,1-Trichloroethane	<25	<5.0	<5.0
1,1,2-Trichloroethane	<25	<5.0	<5.0
Trichloroethene	<25	<5.0	<5.0
Trichlorofluoromethane	<25	<5.0	<5.0
1,2,3-Trichloropropane	<25	<5.0	<5.0
Vinyl acetate	<25	<5.0	<5.0
Vinyl chloride	<50	<10	<10
Xylenes	<u>1500</u>	<5.0	<5.0

Surrogate Recovery(%)

1,4-Bromofluorobenzene	157	97	99
Control Limits: 55 to 167			
1,2-Dichloroethane-d4	100	101	100
Control Limits: 39 to 156			
Toluene-d8	103	101	100
Control Limits: 58 to 146			

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

ERM - North Central

Radian Work Order: 89-07-265

Method:SW8270-Illinois list (1)

List:

Sample ID:	SB1A	SB1B	SB1C	SB2A	SB2B	SB2C
Factor:	1.000	1.000	1.000	3.000	1.000	1.000
Results in:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	038	048	058	068	078	088
Matrix:	solid	solid	solid	solid	solid	solid

Acenaphthene	<1200	<1200	<1200	<3600	<1200	<1200
Acenaphthylene	<660	<660	<660	<2000	<660	<660
Anthracene	<660	<660	<660	<2000	<660	<660
Benzo(a)anthracene	38*	<8.7	<8.7	<26	<8.7	<8.7
Benzo(a)pyrene	39*	<15	<15	<45	<15	<15
Benzo(b)fluoranthene	44*	<12	<12	<36	<12	<12
Benzo(g,h,i)perylene	<51	<51	<51	<150	<51	<51
Benzo(k)fluoranthene	29*	<11	<11	<33	<11	<11
Chrysene	<100	<100	<100	<300	<100	<100
Dibenz(a,h)anthracene	<20	<20	<20	<60	<20	<20
Fluoranthene	<140	<140	<140	<420	<140	<140
Fluorene	<140	<140	<140	<420	<140	<140
Indeno(1,2,3-cd)pyrene	<29	<29	<29	<87	<29	<29
Naphthalene	<660	<660	<660	<2000	<660	<660
Phenanthrene	<660	<660	<660	<2000	<660	<660
Pyrene	<180	<180	<180	<540	<180	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	91	64	94	93	88	101
Control Limits: 33 to 153						
2-Fluorophenol	87	63	95	93	94	95
Control Limits: 20 to 158						
Nitrobenzene-d5	84	62	98	94	87	92
Control Limits: 21 to 159						
Phenol-d5	87	63	94	93	91	96
Control Limits: 27 to 154						
Terphenyl-d14	89	73	105	107	92	102
Control Limits: 0 to 223						
2,4,6-Tribromophenol	92	60	87	91	84	96
Control Limits: 0 to 179						

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central

Radian Work Order: 89-07-265

Method: SW8270-Illinois list (1)

List:

Sample ID:	SB3A	SB3B	SB3C	SB4A	SB4B	SB4C
Factor:	1.000	1.000	1.000	1.000	1.000	1.000
Results in:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
	09B	10B	11B	12B	13B	14B
Matrix:	solid	solid	solid	solid	solid	solid

Acenaphthene	<1200	<1200	<1200	<1200	<1200	<1200
Acenaphthylene	<660	<660	<660	<660	<660	<660
Anthracene	<660	<660	<660	<660	<660	<660
Benzo(a)anthracene	13*	<8.7	<8.7	<8.7	<8.7	<8.7
Benzo(a)pyrene	<15	<15	<15	<15	<15	<15
Benzo(b)fluoranthene	13*	<12	<12	<12	<12	<12
Benzo(g,h,i)perylene	<51	<51	<51	<51	<51	<51
Benzo(k)fluoranthene	<11	<11	<11	<11	<11	<11
Chrysene	<100	<100	<100	<100	<100	<100
Dibenz(a,h)anthracene	<20	<20	<20	<20	<20	<20
Fluoranthene	<140	<140	<140	<140	<140	<140
Fluorene	<140	<140	<140	<140	<140	<140
Indeno(1,2,3-cd)pyrene	<29	<29	<29	<29	<29	<29
Naphthalene	<660	<660	<660	<660	<660	<660
Phenanthrene	<660	<660	<660	<660	<660	<660
Pyrene	<180	<180	<180	<180	<180	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	96	94	91	87	98	93
Control Limits: 33 to 153						
2-Fluorophenol	83	96	93	81	95	93
Control Limits: 20 to 158						
Nitrobenzene-d5	87	93	92	79	89	89
Control Limits: 21 to 159						
Phenol-d5	87	88	87	80	95	91
Control Limits: 27 to 154						
Terphenyl-d14	101	103	107	82	103	101
Control Limits: 0 to 223						
2,4,6-Tribromophenol	90	96	93	92	97	86
Control Limits: 0 to 179						

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

(2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.

ERM - North Central
Radian Work Order: 89-07-265

Method: SW8270-Illinois list (1)

List:

Sample ID:	REAGENT BLANK
Factor:	1.000
Results in:	ug/kg
	18A
Matrix:	solid

Acenaphthene	<1200
Acenaphthylene	<660
Anthracene	<660
Benzo(a)anthracene	<8.7
Benzo(a)pyrene	<15
Benzo(b)fluoranthene	<12
Benzo(g,h,i)perylene	<51
Benzo(k)fluoranthene	<11
Chrysene	<100
Dibenz(a,h)anthracene	<20
Fluoranthene	<140
Fluorene	<140
Indeno(1,2,3-cd)pyrene	<29
Naphthalene	<660
Phenanthrene	<660
Pyrene	<180

Surrogate Recovery(%)

2-Fluorobiphenyl	87
Control Limits: 33 to 153	
2-Fluorophenol	91
Control Limits: 20 to 158	
Nitrobenzene-d5	92
Control Limits: 21 to 159	
Phenol-d5	92
Control Limits: 27 to 154	
Terphenyl-d14	97
Control Limits: 0 to 223	
2,4,6-Tribromophenol	81
Control Limits: 0 to 179	

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State of Illinois

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) 4-Methylphenol co-elutes with 3-methylphenol. The value reported is the combined total of the 2 compounds.



ERM-North Central, Inc.

Environmental Resources Management

102 Wilmot Road • Suite 300 • Deerfield, Illinois 60015 ☎ (312) 940-7200

October 4, 1989

Mr. Dennis Ahlberg
Emergency Response Unit
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62794-9276

RE: Phase II Investigation Report
Suntect Industries, Inc.
Rockford, Illinois

Dear Mr. Ahlberg:

On behalf of Suntect Industries, Inc., enclosed is one copy of our report on the Phase II Investigation conducted at the plant.

Very truly yours,

ERM-NORTH CENTRAL, INC.

James E. Kane

James E. Kane, P.E.
Project Manager

ftt

Enclosure

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Environmental Protection Agency
State of Illinois

Emergency Response

42781
p. 10

PHASE II INVESTIGATION
OF UNDERGROUND STORAGE TANKS
AT SUNTEC INDUSTRIES

OCTOBER 3, 1989

PREPARED BY:

ENVIRONMENTAL RESOURCES MANAGEMENT-NORTH CENTRAL, INC.
102 WILMOT ROAD, SUITE 300
DEERFIELD, ILLINOIS 60015

PROJECT NO. 9059

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PHASE II INVESTIGATION
OF UNDERGROUND STORAGE TANKS
AT SUNTEC INDUSTRIES

1.0 INTRODUCTION

The Suntec Industries, Inc. (Suntec) facility located at 2210 Harrison Avenue, Rockford, Illinois utilized 12 underground storage tanks and two in-ground, vaulted storage tanks for storage of raw materials used in the manufacturing process, waste materials, and motor fuel. This facility currently utilizes two underground tanks for storage of fuel oil used in building space heating. These last two tanks were installed in 1977 to replace two older underground tanks taken out of service at that time. Suntec began a program to close all of the facility's underground storage tanks, except the fuel oil tanks, in January, 1989. The initial steps of this program involved the removal of tank contents, tank cleaning, and sampling and analysis of soils in the immediate vicinity. Examination of the analytical data obtained from these samples indicated that soils in the vicinity of several tanks contained volatile and semivolatile organic compounds. Based on the analytical data, a notification of potential release from these underground tanks was made to the Illinois Environmental Protection Agency (IEPA) by Suntec on February 9, 1989.

At the request of Suntec, Environmental Resources Management-North Central, Inc. (ERM) performed an initial investigation into the degree and extent of organic compounds in the vicinity of the tank. A report presenting the data obtained in this program was

submitted to the IEPA on May 1, 1989. This investigation identified three areas of potential soil contamination in the northern portion of the underground tank area. The May report contained a work plan for a Phase II Investigation designed to obtain further information concerning the horizontal and vertical extent of migration in the identified areas. The Phase II Investigation Work Plan included an additional soil gas survey to indicate the horizontal extent of migration and a series of borings to define the vertical extent of migration in the identified areas.

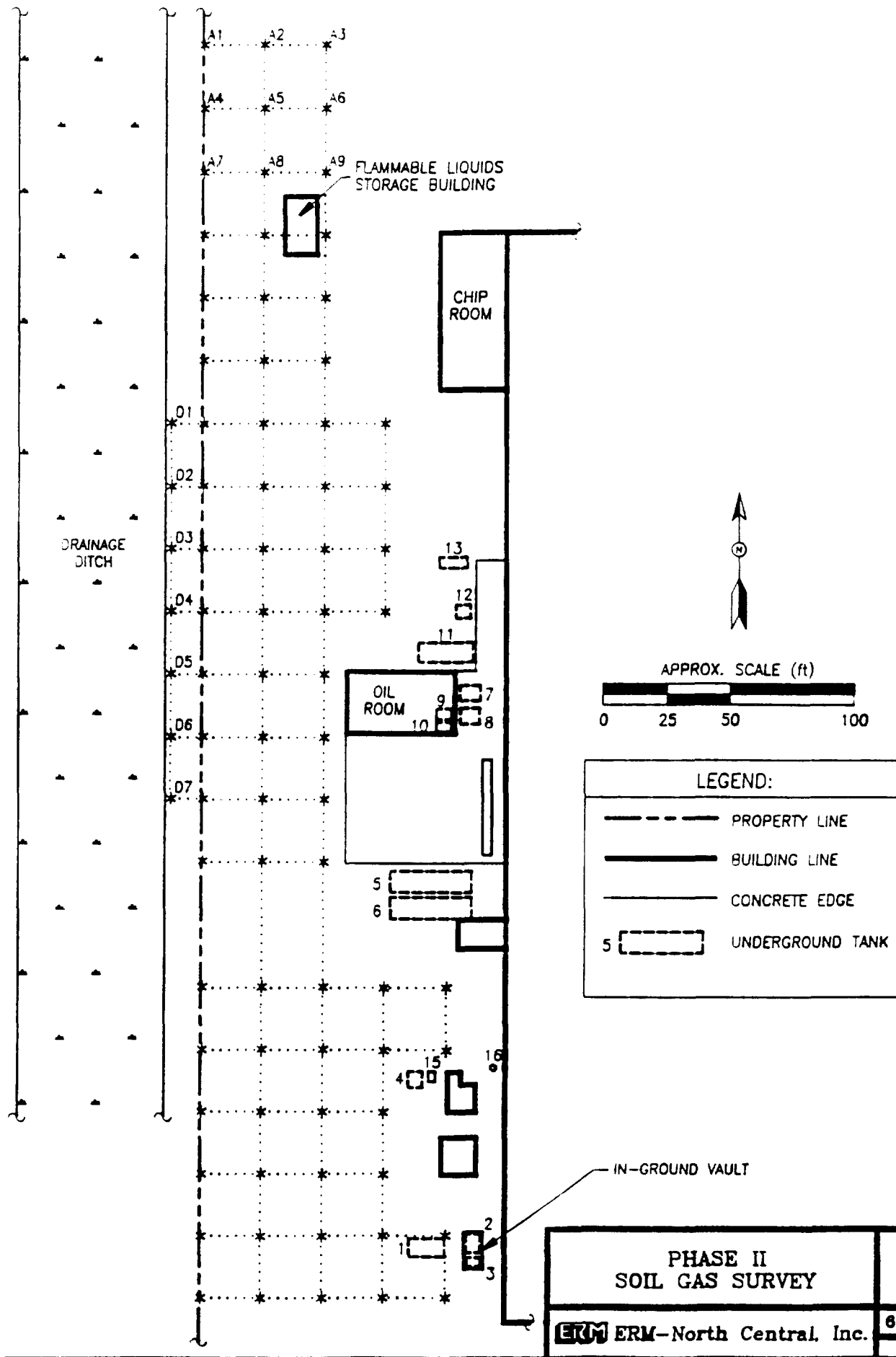
The following sections of this report describe the Phase II Investigation methodology and present all survey data, conclusions and recommendations.

2.0 SOIL GAS SURVEY

The initial soil gas survey indicated that areas of potential soil contamination existed beyond the area investigated. The objective of the followup survey was to indicate the horizontal boundaries of soil contamination through the collection and screening of soil gas for volatile organics.

2.1 Survey Methodology

A 25 foot by 25 foot grid network tied to the western property line, beginning at the northern edge of the area previously tested, was used to locate the gas sampling points. A single line of sampling points, 25 feet apart, was used in the area between the drainage ditch running through adjacent property and Suntec's western property line. All gas sampling points used in the followup survey are shown in Figure 1. The initial survey sampling points are depicted in the figure as asterisks. The



followup survey sampling points are identified with alpha-numeric labels.

The soil gas procedure requires driving a perforated stainless steel probe into the soil and pulling a known quantity of soil vapor through a Teflon tube sampling train. An HNu photoionization detector is used to obtain field measurement of volatile organic concentrations in the soil gas.

2.2 Survey Results

All data recorded during the followup soil gas survey are presented in Table 1. Soil gas levels detected in the initial survey are presented in the May 1, 1989 report.

The soil gas survey were used as a screening technique to indicate if there had been horizontal migration through soils 10 feet or less below ground surface (bgs). Laboratory analysis of representative soil samples taken from the areas indicated by the soil gas surveys provides confirmatory data on the degree and extent of migration.

The table indicates that "hits" were recorded only at Sampling Locations A1, A8, and A9. The meter readings recorded at Locations A3 and D1 were judged to be anomalies, rather than indications of soil contamination, because of the relatively low meter reading (less than 2 Vppm) and the degree of separation from areas of recorded "hits". The meter reading at Location A1 was discounted because of the distance from any known potential source or "hit" area. The following conclusions can be drawn from the data:

- o Soil contamination does not extend beyond the facility's western property line; and

TABLE 1
SOIL GAS SURVEY DATA
MAY 17, 1989

<u>Soil Gas Sampling Location</u>	<u>HNu Meter Reading, ppmv</u>
A1	12
A2	0.0
A3	1.7
A4	0.0
A5	0.0
A6	0.0
A7	0.0
A8	91
A9	9.6
D1	1.3
D2	0.0
D3	0.0
D4	0.0
D5	0.0
D6	0.0
D7	0.0

- o Soil contamination in the vicinity of the Flammable Liquid Storage Building is confined to an area within 25 feet of the northern and western building walls.

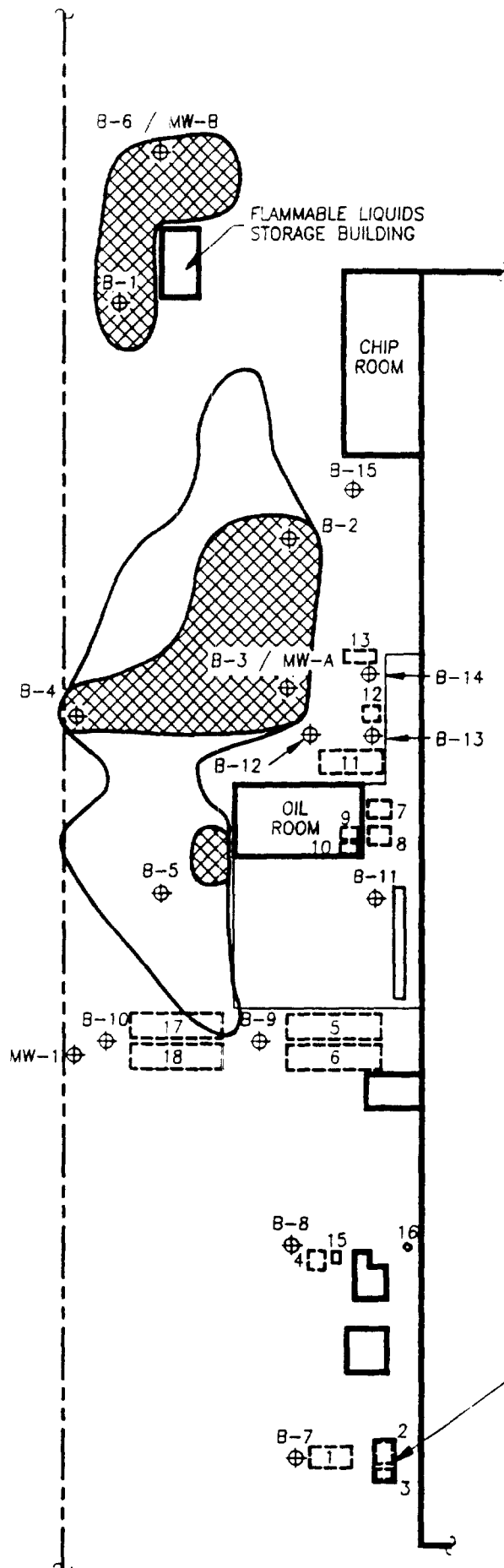
The followup soil gas survey, in combination with the initial survey, has identified two principal areas of concern: (1) within 25 feet of the northern and western walls of the Flammable Liquid Storage Building; and (2) a larger area extending from about the Oil Room to the Chip Room, bounded by the western property line (See Figure 2).

3.0 VERTICAL EXTENT OF MIGRATION

The vertical extent of migration was evaluated using a total of 15 soil borings. The information obtained in the two soil gas surveys was used to select the locations for the initial series of six borings (B-1 through B-6). The final series of nine borings were located to further characterize materials in the immediate vicinity of the underground tanks. The locations of all borings are shown in Figure 2.

3.1 Soil Boring Protocol

Soil samples were obtained from each of the initial six borings at 2.5 foot depth intervals and screened for volatile organics using an HNu photoionization detector (PID). The entire volume of soil contained in the split spoon sampler underwent meter screening. A composite soil sample of each depth interval was prepared, sealed and set aside for possible laboratory analysis. Composite samples representing the final boring depth at each location were submitted for laboratory analysis of VOC and isopropyl alcohol. Additionally, several composite samples were



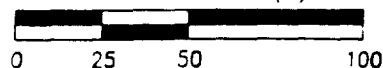
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APPROX. SCALE (ft)



LEGEND:

--- PROPERTY LINE

— BUILDING LINE

[5] UNDERGROUND TANK

B-5
⊕ BORING LOCATIONS

[Cross-hatched area] AREA OF HNu READINGS
GREATER THAN 10 Vppm

[Outline area] AREA OF HNu READINGS
GREATER THAN 5 Vppm

PHASE II SOIL
BORING LOCATIONS

FIGURE
2

ERM ERM-North Central, Inc.

10/3/89

CS

submitted for analysis to quantify apparent migration indicated by elevated meter readings recorded during field screening.

The borings were advanced from ground surface to a depth where:

1. Meter screening indicated the lack of measurable volatile organics, or
2. The saturated zone was encountered.

In two locations, field screening indicated that soil migration potentially extended to a saturated zone. These Borings, B-3 and B-6, were converted to Monitoring Wells MW-3 and MW-6. The final depth below ground surface of MW-6 was only 11 feet. The decision to install this well at a relatively shallow depth was made to prevent the creation of a conduit for materials to migrate to underlying soils.

The final nine borings were used to obtain representative samples of material in the immediate vicinity of the underground tanks at three discrete depths (5, 10 and 15 feet). All samples were screened for the presence of volatile organic compounds using a HNu PID and the method previously described. Soil sampled at each depth was submitted for laboratory analysis of volatile and semivolatile organic compounds.

3.2 Soil Screening and Analysis

Table 2 presents all field screening data obtained in the initial six borings. Complete boring logs and well installation logs prepared by an ERM geologist are presented in Appendix A. The elevated meter readings recorded at a depth of 7 to 13 feet in Borings B-3 and B-6 correspond to a layer of sandy silt between the more typical silty sands. A finer grained material like the silt layer would be less permeable and tend to retain a greater

TABLE 2
SOIL BORING FIELD SCREENING DATA
MAY 23, 1989

Depth Interval (ft)	HNu Meter Reading Vppm					
	B-1	B-2	B-3	B-4	B-5	B-6
0.0 - 2.5	1.8	0.4	1.7	0.0	0.4	0.6
2.5 - 5.0	0.4	0.0	2.6	0.0	0.0	1.2
5.0 - 7.5	0.0	0.6	0.6	0.1	0.2	18.6
7.5 - 10.0		1.2*	124	0.0	0.6	62
10.0 - 12.5		2.1*	150	0.0	0.0	
12.5 - 15.0			8.1			
15.0 - 17.5			1.7			
17.5 - 20.0			1.8			
20.0 - 22.5			1.2			
22.5 - 25.0			0.8			
25.0 - 27.5			1.2			
27.5 - 30.0			1.2			
32.5 - 35.0			0.6			
35.0 - 37.5			0.6			
37.5 - 40.0			4.0*			

* Meter interference resulting from increased moisture content of soil. Readings most probably are a result of soil moisture.

Depth to ground water interface at B-3 was 37 feet and 7 feet at B-6.

portion of compounds migrating through the unsaturated zone than the sands found above and below this layer.

A total of seven composite soil samples from the initial six borings were submitted for laboratory analysis. These samples consisted of "bottom of the boring" samples taken from Borings B-1, B-2, B-4, B-5, and B-6; a sample taken from the 7.5 to 10-foot interval in Boring B-3; and a sample taken from the 2.5 to 5-foot interval in Boring B-2. No detectable concentrations of volatile organic compounds were found in any of the soil samples submitted for laboratory analysis, however, the method detection limits achieved by the laboratory were 1 ppm or higher. As a result, a degree of uncertainty remains as to the extent and concentration of materials in the areas identified by the soil gas survey. It does appear, however, that any materials present are at sub-part-per-million concentration for gasoline components and organic solvents. The complete laboratory report covering these samples is presented in Appendix B.

Information characterizing soils in the immediate vicinity of the facility's underground storage tanks was obtained on two separate occasions.

The initial steps of Suntec's Program to close all underground tanks was conducted by Fehr-Graham & Associates and had included the collection of samples directly beneath the individual tanks. The presence of volatile and semivolatile organic compounds in several samples was the basis for Suntec making the notification of potential release to the IEPA on February 9, 1989. Table 3 contains the analytical data obtained from these samples and is presented for purposes of comparing data from the more recent nine borings.

As noted, the subsequent nine borings were intended to characterize materials in the immediate vicinity of the tanks.

TABLE 3

ANALYTICAL DATA FOR UNDERGROUND TANK BACKFILL SAMPLES

	Underground Storage Tank Number											
	<u>1</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>14</u>	<u>16</u>
<u>Volatile Organics</u>												
Ethyl Benzene	<0.005	160	<2	7.5	<2	<5	<0.5	<0.5	<5	<1	<0.005	<0.005
Tetrachloroethene	<0.005	<10	<2	<5	7.7	7.8	0.5	<0.5	<5	<1	<0.005	<0.005
Toluene	<0.005	170	<2	<5	2.2	<5	<0.5	<0.5	<5	<1	<0.005	<0.005
1,1,1-Trichloroethane	<0.005	<10	5.9	<5	4	<5	1.2	<0.5	<5	<1	<0.005	<0.005
Trichloroethene	<0.005	<10	<2	<5	19	15	3.3	<0.5	<5	<1	<0.005	<0.005
Xylenes	<0.005	520	<2	49	4.6	9.3	<0.5	<0.5	34	<1	<0.005	<0.005
<u>SemiVolatile Organics</u>												
Benzo(a)anthracene	<5	NA	<5	6	<5	<250	<500	<200	13	9	<1	<50
Benzo(b)anthracene	<5	NA	<5	<5	<5	<250	<500	<200	8	6	<1	<50
Benzo(a)pyrene	<5	NA	<5	<5	<5	<250	<500	<200	19	12	<1	<50
Chrysene	<5	NA	<5	<5	<5	<250	<500	<200	16	12	<1	<50
Dibenzo(a,h)anthracene	<5	NA	<5	9	<5	<250	<500	<200	6	<5	<1	<50
Anthracene	<5	NA	<5	<5	<5	<250	<500	<200	5	11	<1	<50
Benzo(k)fluoranthene	<5	NA	<5	<5	<5	<250	<500	<200	8	6	<1	< 5
Benzo(ghi)perylene	<5	NA	<5	<5	<5	<250	<500	<200	6	<5	<1	<50
Fluoranthene Cd	5	NA	7	8	<5	<250	<500	<200	26	24	<1	<50
Indeno(1,2,3-Cd)pyrene	<5	NA	<5	<5	<5	<250	<500	<200	6	<5	<1	<50
Phenanthrene	<5	NA	5	5	<5	<250	<500	<200	21	10	<1	<50
Pyrene	<5	NA	7	12	<5	<250	<500	<200	21	18	<1	<50

All units are mg/kg.

NA - not analyzed.

The analytical data obtained from the samples taken in the final nine borings are presented in Table 4. The data are arranged so that the underground tank corresponding to each boring location is identified. The complete laboratory report covering these samples is presented in Appendix B. The following discussion compares the data contained in Tables 3 and 4 and draws conclusions based on this comparison.

The Fehr-Graham Sampling Program indicated that low levels of semivolatile compounds may exist in the vicinity of Tank No. 1. The second sampling program confirmed that low levels of semivolatile compounds may exist in the vicinity of Tank No. 1. According to Suntec personnel, in recent history, this tank has contained "white gas", a material not containing appreciable levels of semivolatile organic compounds. If semivolatile compounds are present, they may be a result of asphaltic coating on the tank.

The Fehr-Graham Program identified the presence of gasoline constituents under Tank No. 4. Historically, this tank has held gasoline. The second sampling program did not demonstrate the presence of the same components in the vicinity of Tank No. 4. While the high levels of toluene, ethyl benzene and xylene compounds found in the initial sample are consistent with soil contamination resulting from leakage or spillage in the vicinity of a gasoline storage tank, the second sampling indicates that lateral migration of contamination is very limited.

With regards to Tank Nos. 5 and 6, the Fehr-Graham Program recorded concentrations of volatile and semivolatile compounds that can be components of both fuel oil and asphaltic tank coatings. The second sampling identified relatively insignificant concentrations of semivolatile compounds in the vicinity of Tank Nos. 5 and 6 and no volatile compounds. A release of fuel oil from these tanks would most likely have

TABLE 4

ANALYTICAL DATA FOR SOIL BORINGS

Boring Number/Tank Number

	B-7/1			B-8/4			B-9/5,6			B-10/17,18			B-11/7,8,9,10			B12/11			B-13/12		B-14/13			B-15/Chip Room			
Sample Depth (ft)	4-6	9-11	14-16	4-6	9-11	14-16	4-6	9-11	14-16	4-6	9-11	14-16	4-6	9-11	14-16	4-6	9-11	14-16	4.5-5.5	9.5-10.5	4-6	9-11	14-16	4-6	9-11	14-16	
<u>Volatile Organics</u>																											
Benzene														*		*	*										
Ethyl Benzene														*		*											
Toluene														*		*						*					
Xylenes														8000		1100	6600		22000	9800		9000	3200				
Methylene Chloride	12	11	12		11	9.7																					
Methyl Ethyl Ketone																											
Dichlorodifluoromethane		35			10	8.9				11	18		3300														
Trichlorofluoromethane										12																	
1,1,1-Trichloroethane													62000			54	1400										
Trichloroethene													38000				1600										
Tetrachloroethene													25000			280						1500					
<u>Semi-Volatile Organics</u>																											
Benzo(a)anthracene	*					*							54	61		140	70	*	150	*		*			*		
Benzo(a)pyrene	*															*	*		*						*		
Benzo(b)fluoranthene	*					*							*			*	*		*						*		
Benzo(g,h,i)perylene																											
Benzo(k)fluoranthene	*															*	*		*						*		
Fluoranthene																*	*										
Fluorene													*														
Indeno(1,2,3-Cd)pyrene																											
Napthalene													*			*			*								
Phenanthrene													*														
Pyrene													*			*	*										

All units are ug/kg, blanks indicate less than method detection limit.

*Estimated result. Result less than 5 times detection limit.

resulted in soil semivolatile concentrations in excess of those recorded in the sampling programs. According to employees who have worked at the site for the past two decades, waste Stoddard Solvent, a mineral spirits-type solvent containing non-halogenated compounds, had been added to fuel oil contained in Tank Nos. 5 and 6 for burning in the facility's boilers. This practice was discontinued prior to the effective date of regulations prohibiting waste solvent burning for space heating. Therefore, the data does not support the conclusion that a release of fuel oil occurred from these tanks.

The Fehr-Graham Sampling Program did not include the active fuel oil storage tanks, Tank Nos. 17 and 18, because Suntec was not considering closure of these tanks. Suntec is now considering closure. The data obtained from the second program indicates that no volatile or semivolatile compounds are present above detection levels of 5 ppb in the vicinity of these tanks.

The Fehr-Graham Sampling Program indicated the presence of chlorinated and non-chlorinated volatile compounds in the area containing Tank Nos. 7, 8, 9 and 10. These tanks were used to store machining oil for use in the manufacturing process. The second sampling program confirmed the presence of these volatile compounds. Chlorinated and nonchlorinated volatile organics are not known to be components of the machining oils used at Suntec. A release of machining oils from these tanks would most likely have resulted in soil semivolatile concentrations in excess of those recorded in the sampling programs.

A program was implemented in 1984 to remove soils in the area immediately south of the Oil Room contaminated by housekeeping-type surface spills from scrap chip roll-off boxes. Data developed during this cleanup indicated that the same chlorinated and nonchlorinated volatile organics were present at depth in levels similar to those recorded in the second sampling program.

ERM has not developed information in this investigation to determine if the existing presence of volatile compounds is related to the 1984 program.

The available data does not support the conclusion that a release occurred from Tank Nos. 7, 8, 9, and 10.

The Fehr-Graham Sampling Program indicated the presence of xylene in the vicinity of Tank Nos. 11 and 12. The second sampling program confirmed that xylene was present in the vicinity of these tanks. According to Suntec personnel, Tank No. 11 had been used to store fresh Stoddard Solvent. Tank No. 12 had been used to store waste Stoddard Solvent. Suntec personnel indicated that the storage of waste solvent in this tank was discontinued prior to the effective date of regulations prohibiting storage of this material in such tanks. Waste solvent was poured into Tank No. 12 from small, portable containers. Fehr-Graham's Investigation and Report indicated that the area immediately surrounding the tank fill connection was heavily stained. Examination of the data obtained from Boring B-13 of the second program (see Table 4) indicates that the concentration of xylene decreases with depth below ground surface. A contaminant profile such as this, would be consistent with a surface release resulting from overfilling/ spillage rather than a tank release. Since chlorinated volatile organics are not components of Stoddard Solvent, their presence in the nearby area are not indicative of a tank release.

Tank No. 13 reportedly was used to store isopropyl alcohol. The Fehr-Graham sampling limited sample analysis to isopropyl alcohol. The second sampling program identified significant concentrations of xylenes, and at depth, tetrachloroethene. There is no evidence that materials stored in this tank had these compounds as constituents.

The second round of sampling included a Boring (B-15) located immediately south of the Chip Room to evaluate the potential for chip handling activities as a source of soil contamination. Except for insignificant levels of four semivolatile compounds, no contaminants were identified in these samples. Therefore, the potential for Chip Room activities contributing to soil contamination otherwise identified at this facility is negligible.

3.3 Ground Water Monitoring

Monitoring Well MW-A was developed and sampled after installation. Monitoring Well MW-B was bailed dry during development, and no water was present for sampling. Water was present in Monitoring Well MW-A at a depth of 37 feet bgs. The shallow depth (7 feet bgs) of water in Monitoring Well MW-B coupled with the lack of well recharge indicates that this well was completed in a perched zone of saturation, rather than a continuous ground water interface.

A sample of ground water obtained from MW-A was submitted for laboratory analysis of volatile compounds and isopropyl alcohol. The analytical data obtained from this sample are summarized in Table 5. The complete laboratory analytical report is given in Appendix B. Table 5 presents concentrations for only those compounds present above the method detection limits. The laboratory testing indicated that chlorinated solvents, primarily trichloroethene (TCE) and its related breakdown products, were present in the ground water sample. No additional ground water sampling from new or existing monitoring wells was performed as part of the Phase II Investigation, but further ground water testing is recommended. Ground water quality data obtained during the 1984 cleanup activities, however, documented that these compounds were present in ground water entering the

TABLE 5
GROUND WATER ANALYTICAL DATA
MAY 23, 1989

<u>Parameter</u>	<u>Concentration, ug/l</u>
Chloroform	2.8
1,1-Dichloroethane	143
1,1-Dichloroethene	1.6
cis-1,2-Dichloroethene	318
trans-1,2-Dichloroethene	2.6
Tetrachloroethene	62
Trichloroethene	118

Harrison Avenue facility, at the east side, as well as in ground water near to the location of MW-A (MW-1 on Figure 2).

As part of the final series of borings described in Section 3.2, ERM obtained a sample of liquid remaining in Tank No. 11. It is assumed that this liquid is wash water not completely removed during tank cleaning. Laboratory analysis of this liquid measured 1500 ug/l xylenes and 670 ug/l methylene chloride. The Fehr-Graham Report covering the initial tank closure activities stated that a sludge-like material was present in Tank No. 11 at the time of cleaning. This sludge was removed, analyzed and disposed as an ignitable hazardous waste. The entire volume of sludge removed from the tank was less than 55 gallons. The presence of a liquid containing xylene in this tank is consistent with the earlier sludge removal and tank cleaning, as well as information regarding the tank.

4.0 SUMMARY AND CONCLUSIONS

The Phase II Investigation used a followup soil gas survey and a total of 15 borings to determine the horizontal and vertical extent of soil migration in the area of the facility's underground storage tanks.

The initial and followup soil gas surveys identified the horizontal boundaries of two principal areas of concern: (1) an area extending 25 feet radially from the Flammable Liquid Storage Building's northern and western walls; and (2) a larger area extending from approximately the Oil Room to the Chip Room, bounded by the western property line and the main facility building.

Laboratory analysis of soil samples obtained from a series of soil borings located in these areas indicated that any materials

present are at a sub-part-per-million concentration for gasoline components and organic solvents.

Two soil sampling programs provided more complete information on contaminant levels in the immediate vicinity of the individual underground tanks. Based on this information, a release most likely occurred at Tank No. 4. However, no significant horizontal migration has appeared to have occurred. The information also indicates that subsurface contamination exists in the vicinity of Tank Nos. 5, 6, 7, 8, 9, 10, 11, 12, and 13. The presence of xylene around Tank Nos. 11, 12 and 13, as well as a lesser amount under Tank No. 6 may have been caused by Stoddard Solvent transfer. There is no indication any of the tanks around which chlorinated solvents were found, particularly Tank Nos. 7, 8, 9 and 10, ever held chlorinated solvents and the data does not otherwise support a conclusion that a release has occurred from these tanks. A ground water sample obtained from Monitoring Well MW-A contained trichloroethene and its breakdown products.

5.0 RECOMMENDATIONS

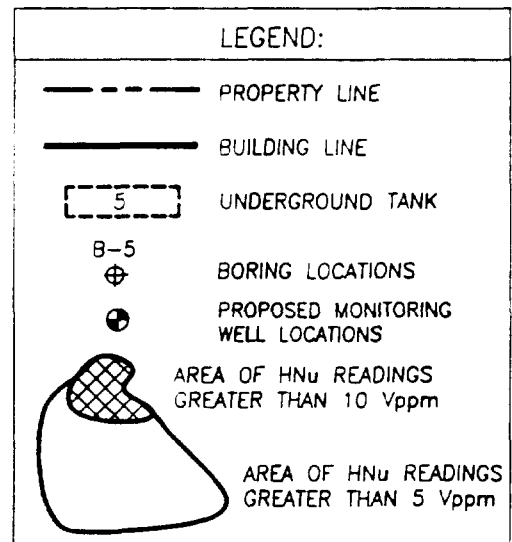
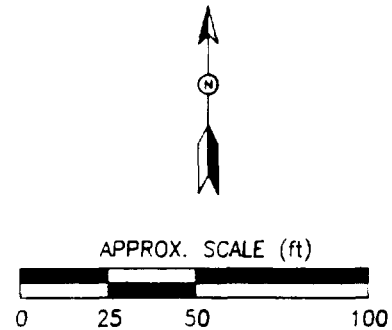
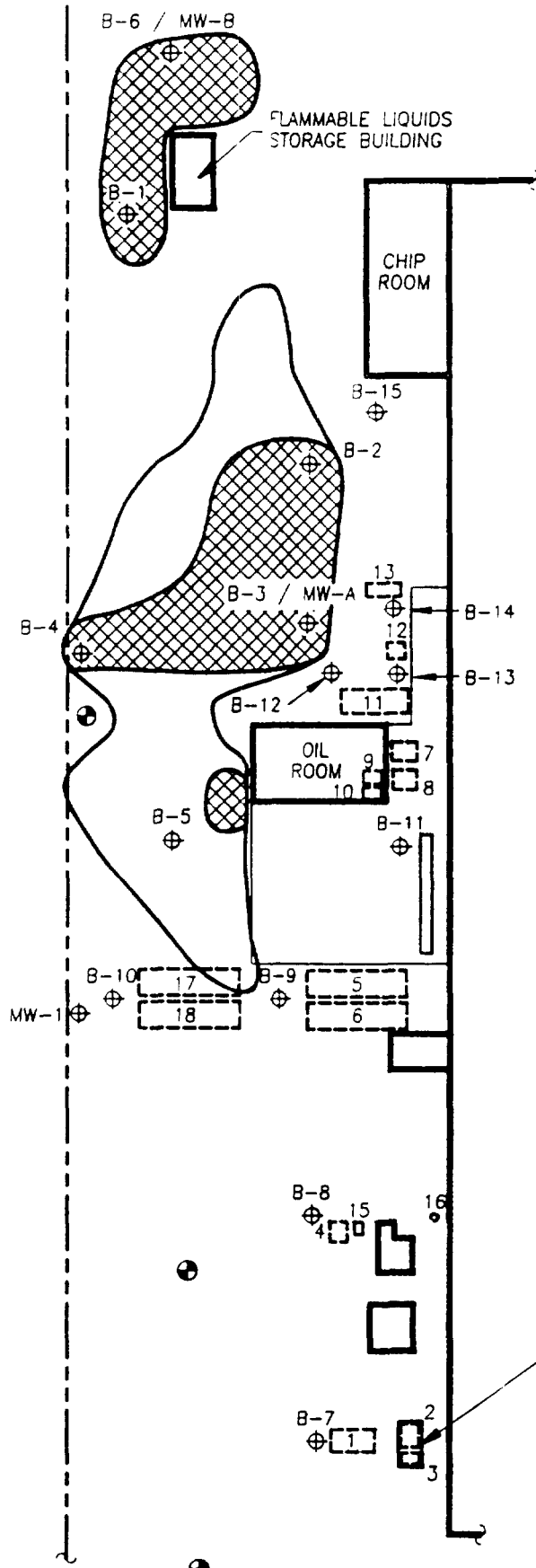
ERM recommends that a three-phased program be used to complete the closure of the facility's underground storage tanks. These phases are: (1) a ground water investigation; (2) an investigation of potential soil remediation techniques; and (3) tank removal or closure in-place.

The ground water investigation will utilize all existing wells to develop data on the characteristics of site ground water quality and flow direction. Information obtained in this investigation will permit the assessment of the degree of impact, if any, that releases from facility underground tanks have had on local ground water quality. Three monitoring wells were installed in 1984, two along the east end and one along the west

end. A fourth monitoring well was installed as part of this investigation. Three additional monitoring wells will be installed in the locations shown in Figure 3 to better characterize ground water quality at the facility. Information on site ground water quality, an assessment of any impacts and recommendations for additional actions will be presented in an Investigation Report. It is expected that the three additional monitoring wells can be installed and developed by October 27th. Sampling of all monitoring wells should be completed by November 3rd. Laboratory analysis for volatile and semivolatile organic compounds should be completed by November 30th, with submittal of the Investigation Report by December 15th.

The soil remediation investigation will examine potential methods for "source elimination", in-situ remediation of contaminated soils. Soil ventilation appears to be one potential "source elimination" method because of the concentration and type of compounds identified. ERM will prepare a Remedial Action Work Plan presenting design information for the selected soil remediation method and the proposed soil cleanup levels incorporating IEPA's most recent guidelines, for submission to IEPA at the completion of this investigation. It is expected that the soil remediation investigation and preparation of the Remedial Action Work Plan can be completed by November 30th. Implementation of the proposed remedy will follow approval of the Work Plan by IEPA.

Tank removal and final closure activities will be implemented as soon as possible. The determination as to which tanks will be excavated or closed in-place will be made based on all available information. The appropriate permits will be obtained from the Illinois State Fire Marshal's Office prior to closure.



PROPOSED GROUND WATER MONITORING WELL LOCATIONS	FIGURE
	3
	10/3/89
ERM ERM-North Central, Inc.	CA

APPENDIX A

DRILLING LOG

Owner Sunter

W.O. Number 7059

Drilling Company Fox Drilling Drilling Method Hollow Stem Auger

Sampling Method Split Spoon Log By MER Date Drilled 5-23-79

DEPTH	PH	BLOWS	HNU (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION
					Color, Texture, Structures
					Asphalt Base coarse
					1.0'
			1.8	A	Fill, SM- sand, silty, gravelly, brown, moist, moderately Dense Lenses of Black Silt
			0.4	B	SP - Sand, very slightly silty, brown, very moist, Loose, medium to Fine grain size
			0.0	C	7.0'
					SM - sand, very silty, dark brown, very moist, Loose
					7.5'
					Bottom of Boring

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec Owner Suntec
 Location Rosford W.O. Number: 9059
 Well Number MW-3/B-3 Total Depth 40' Diameter 7"
 Surface Elevation No Datum Water Level: Initial 37' 24-Hrs _____
 Screen: Dia 2" Length 5' Slot Size 2.01
 Casing: Dia 2" Length 40' Elevation Flush Mant Type PVC
 Drilling Company Fox Drilling Drilling Method Hollow Stem Auger
 Sampling Method Split Spoon Log By MER Date Drilled 5-24-89

DEPTH	PH	BLOWS	HNJ (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION
					Color, Texture, Structures
					Asphalt & Base coarse
					1.5'
		7	1.7	A	ML - silt, sandy, black, stiff, slightly moist
		8			2.5'
		4			SP - sand, slightly silty, reddish brown, moist, loose to
		3	2.6	B	moderately dense
		3			4.0'
5		6			Brown, medium to fine grain size
		3			
		4			
		8	0.6	C	
		11			
		16			
		4			
		7			
		6	124	D	9.5'
10		9			SM-ML - Alternating lenses of silty sand and sandy silt, gray,
		11			moist, stiff, diesel oil smell
		7			
		11			
		14	150	E	
		13			
		14			
		6			
		6			
		11	8.1	F	13.5'
15		15			SP - Sand, very slightly silty, light brown, slightly moist,
		19			fine to medium grain size
		6			
		10			
		16	1.7	G	
		20			
		25			
		10			
		12			
		15	1.8	H	
		16			
20		24			
		10			
		12			
		14	1.2	I	
		18			
		23			
		10			
		10			
		17	0.8	J	24.6'
25		19			ML-SM - Lenses of silt and silty sand, light brown, moist to wet, stiff,
		34			3" Saturated zone from 25.7' to 26'
		10			
		17			
		21	1.2	K	26.0'
		26			SP - Sand, very slightly silty in places, light brown, slightly moist,
		21			dense to very dense, fine to medium grain size
		7			

DRILLING LOG

DEPTH	PH	BLOWS	FNU (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION
					Color, Texture, Structures
					Page 2 of 2
30		80 88 16 19 7 18 22 18 17	1.2	L	SP - sand continued
		6 8 9 10 15	0.6	M	
35		9 22 57 58 34	0.6	N	
		3 6 8 12 16	1.1	O	37.2' water - moderately dense to dense
40			4.0	P	40.0' Bottom of Boring

DRILLING LOG

Owner Suntec

W.O. Number 9259

Total Depth

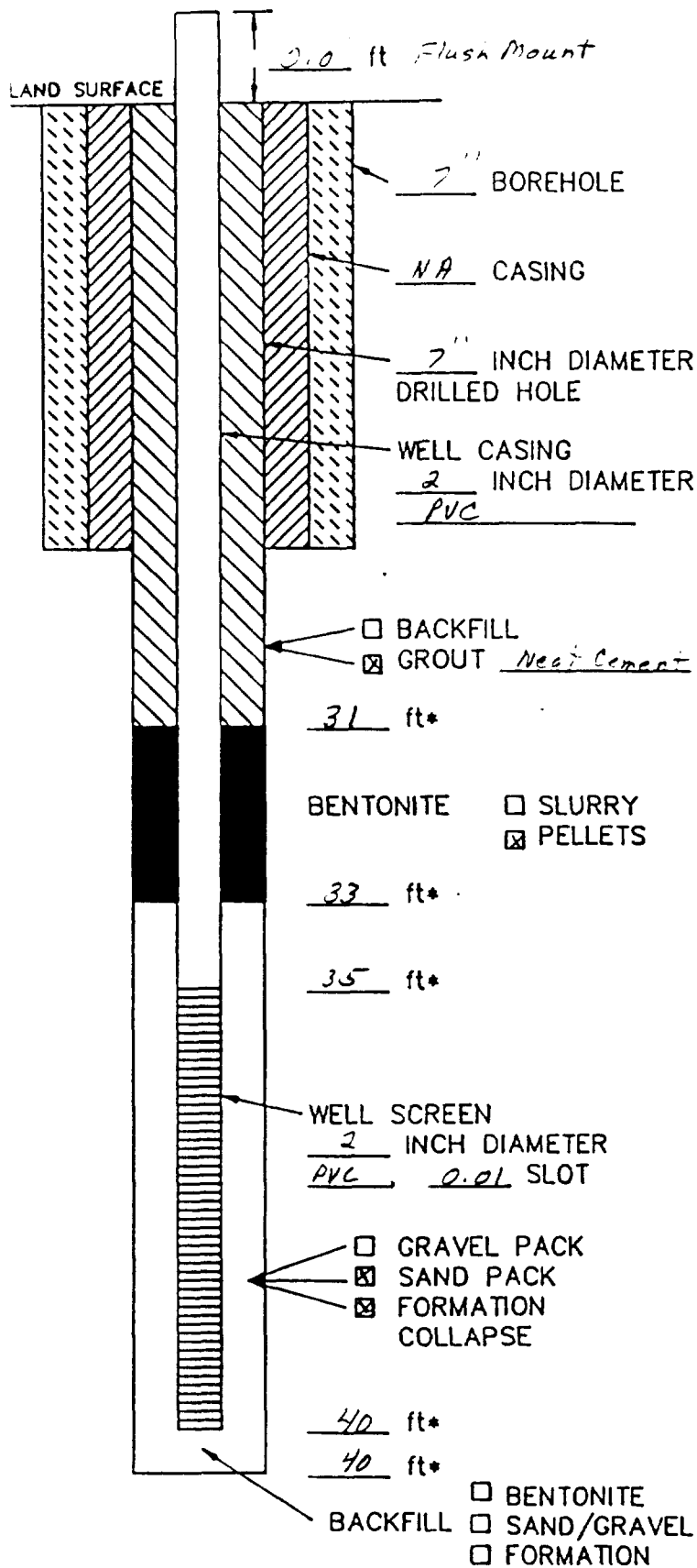
Drilling Method Hollow Stem Auger

Sampling Method Split Spoon Log By MER Date Drilled 5-24-89

[illegible]

DRILLING LOG

DEPTH	PH	BLOWS	HNU (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION
					Color, Texture, Structures
					Top Soil - Silt + Roots
		2			0.5'
		4	0.6	A	ML-CL - Lenses of Silt and clay, very sandy, Black to dark brown, moist, stiff
		9			
		11			
		8	1.2	B	
		10			5.0'
		12			water - small sand stringers
5		2			5.5'
		5	18.6	C	SP- Sand, Gray, very moist to wet, Loose to Moderately dense, fine to medium grain size
		4			
		5			
		3			
		2			
		2	62	D	9.5'
10		4			ML- Silt, very sandy, grayish green, wet, firm to stiff
					100'
					Bottom of Boring



MEASURING POINT IS TOP OF WELL CASING UNLESS OTHERWISE NOTED.

* DEPTH BELOW LAND SURFACE

PROJECT Santee WELL MW-3
 TOWN/CITY Rockford
 COUNTY _____ STATE Illinois
 PERMIT NO. _____
 LAND-SURFACE ELEVATION _____
 AND DATUM None feet ☐ SURVEYED ☐ ESTIMATED
 INSTALLATION DATE(S) 5-24-89
 DRILLING METHOD Hollow Stem Auger
 DRILLING CONTRACTOR Fox Drilling
 DRILLING FLUID None

DEVELOPMENT TECHNIQUE(S) AND DATE(S)
3 Volumes Removed, 1.5 gallons
5-25-89

FLUID LOSS DURING DRILLING NA G.
 WATER REMOVED DURING DEVELOPMENT
1.5 G.

STATIC DEPTH TO WATER
 _____ FEET BELOW M.

PUMPING DEPTH TO WATER
40.0' FEET BELOW M.

PUMPING DURATION NA HOURS

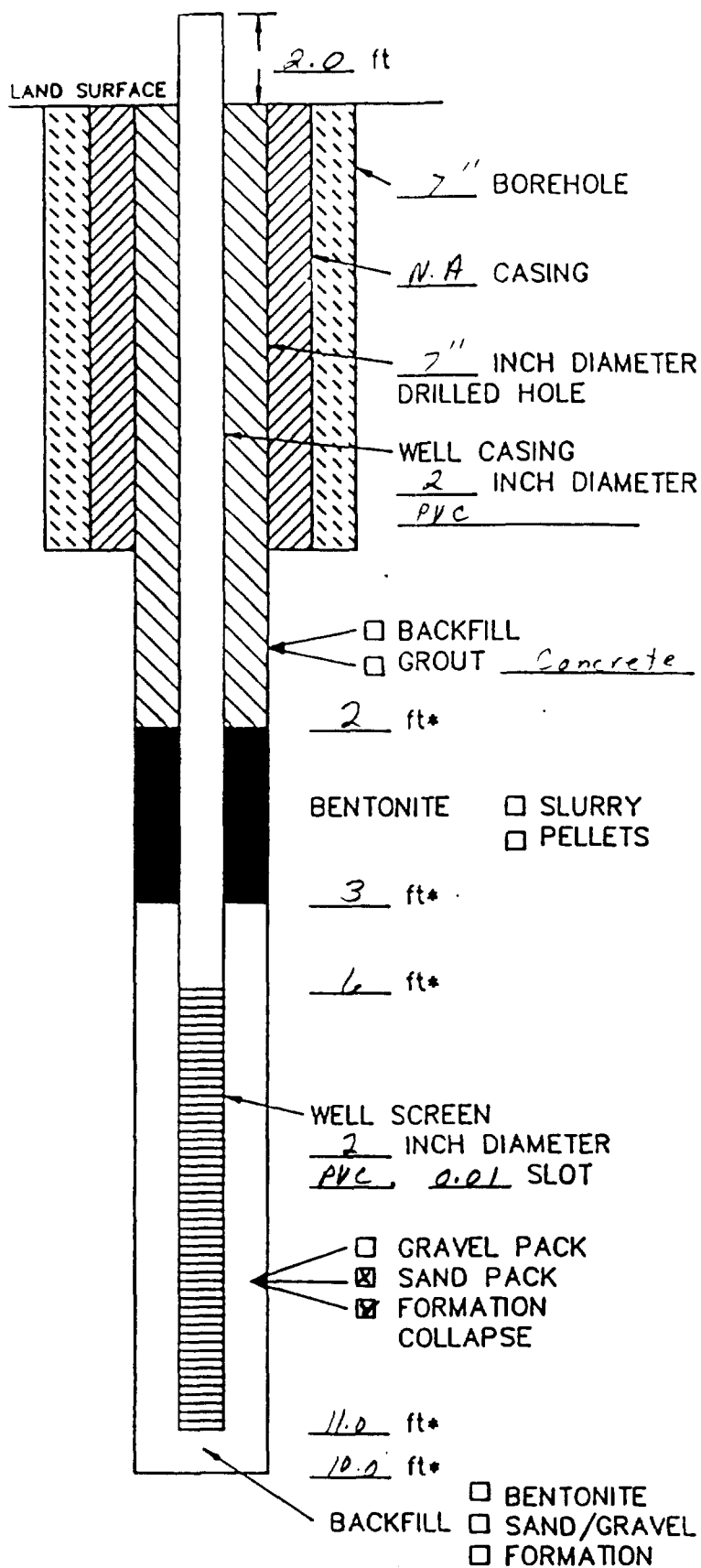
YIELD NA gpm DATE _____

SPECIFIC CAPACITY NA gpm/ft

WELL PURPOSE Monitor & Sampling We

REMARKS _____

PREPARED BY MER



MEASURING POINT IS TOP OF WELL CASING UNLESS OTHERWISE NOTED.

* DEPTH BELOW LAND SURFACE

PROJECT Suntec WELL MW-6
 TOWN/CITY Packland
 COUNTY _____ STATE Illinois
 PERMIT NO. _____
 LAND-SURFACE ELEVATION _____
 AND DATUM None feet ☐ SURVEYED ☐ ESTIMATED
 INSTALLATION DATE(S) 5-25-89
 DRILLING METHOD Hollow Stem Auger
 DRILLING CONTRACTOR Fix Drilling
 DRILLING FLUID None

DEVELOPMENT TECHNIQUE(S) AND DATE(S)
N.A.

FLUID LOSS DURING DRILLING None G.
 WATER REMOVED DURING DEVELOPMENT
N.A. G.

STATIC DEPTH TO WATER
No Datum FEET BELOW M.

PUMPING DEPTH TO WATER
N.A. FEET BELOW M.

PUMPING DURATION N.A. HOURS
 YIELD N.A. gpm DATE _____

SPECIFIC CAPACITY N.A. gpm/ft

WELL PURPOSE Monitor & Sampling well
in the event enough water builds

REMARKS well is deeper than Barin
because the driller pushed the
well point into the sand silt
1.0'.

PREPARED BY NER

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project SanTec IndustriesOwner SanTec IndustriesLocation Rockford, ILW.O. Number 9155JKBorehole Number SBITotal Depth 16.0'Diameter 5 1/2"Drilling Company Ramonde DrillingDrilling Method 3 1/4" I.D. HS-AugerSampling Method 2" x 2' Split Sampling By D.P. EdwardsDate Drilled 7-24-89

DEPTH	Sample Recovery	BL OWS	Wt (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					0.2' Dark brown, poorly sorted clayey fm sand w/ rootlets, moist, no odor (Topsoil)
2					Light brown, poorly sorted, v. loose, fm-med sand with tr. cr sand (10%) and fm gravel (2%), no bedding, no odor, moist (F. 11)
3					
4					
5	14 1/2"	7			
		1			
6		2			
		1			
7					5.8' Light brown, med. well sorted, loose, vt-fm sand, no bedding, no odor, dry.
8					
9					Light brown, med. well sorted, loose, silty vt-fm sand, no bedding, no odor, moist.
10	12 1/2"	6			
		4			
11		4			
		12			
12					
13					Light brown, well sorted, med. dense, med-fm sand w/ trace vt sand, hor. laminated, occ. FeOx staining, dry.
14					
15	22 1/2"	7			Light brown, well sorted, dense, silt, occ. FeOx stain, wet.
		14			
		28			Light brown, well sorted, dense, med-fm sand w/ tr. vt sand, hor. laminated, occ. FeOx stain, moist.
16		32			
					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Switec IndustriesOwner Switec IndustriesLocation Rockford, ILH.O. Number 9155JKBorehole Number SB2Total Depth 16.0'Diameter 5 1/2"Drilling Company Rainwater DrillingDrilling Method 3 1/4" I.D. H.S. AugerSampling Method 2"x2" Split Sam Log By D.P. EdwardsDate Drilled 7-24-89

DEPTH	Sample Recovery	BL OMS	Wt (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
0.1'					Asphalt
0.9'					Light brown, poorly sorted, fw sandy fw-cr gravel, clay (aggregate base)
2'					Dark brown, poorly sorted, clay w/ ir. sand & gravel, no bedding, moist.
3'					Reddish brown, well sorted, loose, fw sand, no bedding, no odor, moist.
4'		4			
5'	24 1/24"	4			
		3	0.0	SB2A 1125	
		2			
6'					Reddish brown, med. well sorted, loose, fw-med sand, no bedding, no odor, moist.
7'					
8'					Light brown, medium dense, well sorted silt, hor. laminated, no odor, saturated, interbedded with well sorted, wf-fw sand, hor. laminated, occ. FeOX stain, moist.
9'		10			
10'	24 1/24"	19	0.0	SB2B 1135	
		25			Light brown, very dense, well sorted, fw sand w/ trace med. sand, occ. FeOX stain, moist.
		27			
11'					
12'					
13'					Light brown, well sorted, dense, silt, horizontally laminated, no odor, moist.
14'		19			
15'	14 1/24"	20	0.0	SB2C 1205	
		28			Light brown, well sorted, dense fw sand, hor. laminated, no odor, dry, thin silt bed, moist.
		32			
16'					Light brown, well sorted, dense silt, hor. lam., no odor, saturated.
					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILW.O. Number 9155JKBorehole Number SB3Total Depth 16.0'Diameter 5 1/2"Drilling Company Rainwater DrillingDrilling Method 3 1/4" I.D. H.S. AugerSampling Method 2"x2' Split SpoonLog By D.P. Edwards Date Drilled 7-24-89

DEPTH	Sample Recovery	BLOWS	W (Vpm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					Reinforced Concrete
2					Light brown, poorly sorted, fw-cr sand w/ trace cr. gravel, no odor, dry (Aggregate Base).
3					Dark brown, poorly sorted, clayey fw-med. sand, no odor, no bedding, moist (backfill).
4					
5	18"/24"	15 5 4 3	0.0	SB3A 1320	Light brown, med. well sorted, loose, fw sand w/ trace clay & fw gravel, no bedding, no odor, moist (backfill).
6					
7					
8					
9					Light brown, well sorted, medium dense, fw & vf sand, horizontal to low angle stratification, alternating fw sand and vf sand laminae, occ. FeOx stain, no odor, moist.
10	19"/24"	6 13 18 24	0.0	SB3B 1335	
11					
12					
13					Light brown, dense, interbedded silt w/ trace vf sand and fw-vf sand, well sorted by laminae, horizontally laminated, no odor, wet silt, moist sand.
14					
15	14"/24"	13 19 26 31	0.0	SB3C 1342	Light brown, well sorted, dense, fw sand, horizontally laminated, no odor, clay.
16					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILW.O. Number 9155JKBorehole Number SB4Total Depth 16.0'Diameter 5 1/2"Drilling Company Rainwater DrillingDrilling Method 3 1/4" I.D. H.S. AugerSampling Method 2"x2" Split Sam Log By D.P. EdwardsDate Drilled 7-24-89

DEPTH	Sample Recovery	BLOWS	WAT (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
					0.3' Asphalt
1					Light brown, poorly sorted, fw-cr sand w/ some clay and trace cr. gravel, no odor, dry (Aggregate Base)
2					
3					Dark brown, poorly sorted, fw-med sandy clay w/ trace cr. gravel, no odor, moist (fill)
4					
5	16 1/24"	8 11 18 18	0.0	SB4A 1442	Light brown, well sorted, medium dense, fw sand, no bedding, no odor (backfill)
6					
7					
8					
9					Light brown, med. well sorted, med. dense, fw-vf sand w/ some silt, hor. laminated, occ. FeOx stain, no odor, moist.
10	21 1/24"	11 20 25 32	0.0	SB4B 1449	
11					Light brown, well sorted, dense, fw sand, hor. laminated, no odor, dry.
12					
13					
14					
15	24 1/24"	10 15 20 28	0.0	SB4C 1500	Lt. brown, med. dense, well sorted, med. sand interbedded w/ med. well sorted, silt w/ tr. vf sand, hor. laminated, occ. FeOx stain, no odor, wet silt, dry sand.
16					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILW.O. Number 9155 JKBorehole Number SB35Total Depth 15.0'Diameter 3"Drilling Company ERM-N.C.Drilling Method 3" Hand AugerSampling Method 3" Hand AugerLog By D.P. EdwardsDate Drilled 7-25-89

DEPTH	pH	BLOWS	Mo (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					Reinforced Concrete
2					Yellowish brown, poorly sorted, fm-cr sand w/ some fm & cr. GRAVEL NO odor, NO bedding, moist (Aggregate Base).
3					Dark brown, poorly sorted vt-med. sand w/ tr. cr. sand & cr. gravel, strong solvent odor, moist.
4					Dark brown to black, poorly sorted, clayey fine to med. sand w/ tr. gravel, strong odor, moist.
5	N/A	N/A	0.0	SB3A 1230	Reddish brown, well sorted, fm sand w/ tr. med.-cr. sand, strong solvent odor, moist.
6					
7					
8					Buff, interbedded, well sorted silt and well sorted vt-fm sand, hor. laminated, slight solvent odor, moist
9					silt, dry sand.
10	N/A	N/A	0.0	SB3B 1245	Buff, well sorted, vt sand, slight solvent odor, dry.
11					
12					
13					
14					
15	N/A	N/A	0.0	SB3C 1300	
					End of Boring 15.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILW.O. Number 9155JKBorehole Number SB6Total Depth 16.0'Diameter 5 1/2"Drilling Company Raimondo DrillingDrilling Method 3 1/4" I.D. HS-AugerSampling Method 2"x2' Split Sam Log By D.P. EdwardsDate Drilled 7-24-89

DEPTH	Sample Recovery	BLOWS	FW (Vpm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					<u>Asphalt</u> Dark brown, poorly sorted, clayey fw-cr sand w/ trace fw & cr gravel, sticky, solvent odor.
2					
3					
4					- Encountered concrete structure (tank saddle) or fill
5	6 1/2"		40.0	SB6A 1730	Dark brown, poorly sorted, loose, fw-cr sand w/ trace fw & cr gravel interbedded with dark brown clay, thin laminae, sticky, strong solvent odor, moist. (Fill)
6					
7					
8					
9					
10	0 1/2"		N/A	N/A	No recovery, probably more fill.
11					
12	22 1/2"	19			Light brown, mod. well sorted, dense, fw-vf sand, horizontally laminated, strong solvent odor, moist.
13	22 1/2"	25			Light brown, dense, silt, horizontally laminated, occ. interbedded fw-vf sand laminae, strong solvent odor, moist.
14	22 1/2"	32	160	SB6B 1745	Light brown, well sorted, dense, vf-fw sand, horizontally laminated, strong solvent odor, dry.
15	20 1/2"	6			Light brown, well sorted, dense, silt interbedded with well sorted fw-vf sand, horizontally bedded, strong solvent odor, moist.
16	20 1/2"	19			
		26	165		
		32		SB6C 1800	
					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILA.O. Number 9155 JKBorehole Number SB7Total Depth 11.3'Diameter 3"Drilling Company ERM-N.C.Drilling Method 3" Hand AugerSampling Method 3" Hand Auger Log By D.P. EdwardsDate Drilled 7-25-89

DEPTH	PH	BLOWS	HNU (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION
					Color, Texture, Structures
1					Light brown, med. well sorted, fn-med sand w/ tr. of sand and cr. gravel, no bedding, no odor, wet (backfill).
2					Gray, poorly sorted, fn-med sand, w/ tr. of sand & cr. gravel, no bedding, v. strong solvent odor, only sheer, moist. (Fill)
3					
4					
5	N/A	N/A	164	SB7A 835	
6					
7					
8					
9					- Encounter piece of wood.
10	N/A	N/A	108	SB7B 1043	Buff, well sorted, vt-fn sand, v. strong solvent odor, moist.
11					Buff, well sorted, silt interbedded w/ well sorted, vt-fn sand, v. strong solvent odor, dry.
12					End of Boring 11.3' due to Auger Refusal.
13					
14					
15					

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec IndustriesOwner Suntec IndustriesLocation Rockford, ILW.O. Number 9155JKBorehole Number SB8Total Depth 16.0Diameter 5 1/2"Drilling Company Rainwater DrillingDrilling Method 3 1/4" E.D. H.S. AugerSampling Method 2"x2" Split Spun Log By D.P. Edwards Date Drilled 7-25-89

DEPTH	Sample Recovery	BLD'S	HW (Vols)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					Light brown, med. sorted, fn-med sand w/ tr. cr. gravel, no bedding, no odor, wet (backfill).
2					Light reddish brown, well sorted, loose, fn sand, no bedding, occ. FeOx staining, occ. dark brown spots, no odor, dry.
3					
4					
5	2 1/4"	4	24	SB8A 915	
6		4			
7					
8					Light brown (buff), well sorted, med. dense, fn sand, hor. laminated interbedded with light gray silt, solvent odor, moist.
9		11			
10	2 3/4"	18	118	SB8B 925	
		18			
		34			
11					Buff & greenish gray, medium dense-dense, silt interbedded with vf & fn sand, horizontally laminated, solvent odor, moist.
12					
13					
14		18			
15	1 1/4"	30	126	SB8C 935	
		42			
		55			
16					End of Boring 16.0'

ERM-NORTH CENTRAL, INC.

DRILLING LOG

Project Suntec Industries Owner Suntec Industries
 Location Rockford, IL H.O. Number 9155JK
 Borehole Number SB9 Total Depth 16.0' Diameter 5 1/2"
 Drilling Company Rainwater Drilling Drilling Method 3 1/4" I.D. HS-Auger
 Sampling Method 2"x2' Split Spun Log By D.P. Edwards Date Drilled 7-25-89

DEPTH	Sample Recovery	BLOGS	H ₂ O (Vppm)	Sample Number	DESCRIPTION/SOIL CLASSIFICATION Color, Texture, Structures
1					<u>Asphalt</u> Gray, poorly sorted, fn-med sand w/ some fn & cr. gravel, NO bedding, NO odor, dry (Aggregate Base).
2					DARK brown, poorly sorted, med. dense, clayey fn-med. sand w/ tr. fn & cr. gravel, organic odor, FeOX staining, oil staining, dry (Fill).
3					
4					
5	24 1/24"	6 11 16 26	2.5	SB9A 1035	Light reddish brown, well sorted, medium dense, fn sand, NO bedding, NO odor, occ. FeOX staining, dry.
6					
7					
8					Light brown, well sorted, loose, vf sand, NO bedding, NO odor, dry
9					
10	10 1/24"	5 11 18 22	0.0	SB9B 1050	Light brown, well sorted, med. dense, fn sand, horizontal bedding, NO odor, dry. Light brown, med. dense, well sorted vf sand interbedded with silt, hor. laminated, NO odor, dry sand, moist silt.
11					Light brown, well sorted, med. dense, fn sand, horizontally bedded, NO odor, dry.
12					
13					Light reddish brown, dense, well sorted silt interbedded with fn & vf sand, well sorted horizontally bedded, occ. FeOX staining, NO odor, dry sand, moist silt.
14					
15	14 1/24"	6 25 37 50	0.0	SB9C 1100	
16					End of Boring 16.0'

APPENDIX B



NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Midwest, Inc.
Bartlett Division
850 West Bartlett Road
Bartlett, IL 60103
Tel: (312) 289-3100
Fax: (312) 289-4180

ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82422

Sample Description: B-1-C; B-1
Suntec

Date Taken: 05-23-89 1600

Date Received: 05-25-89 1445

Solids, Total

85.92

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82422

Sample Description: B-1-C; B-1
Suntec

Date Taken: 05-23-89 1600

Date Received: 05-25-89 1445

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.


Neal E. Ciegghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82422

Sample Description: B-1-C; B-1
Suntec

Date Taken: 05-23-89 1600

Date Received: 05-25-89 1445

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82423

Sample Description: B-2-B; B-2
Suntec

Date Taken: 05-23-89 1640

Date Received: 05-25-89 1445

Solids, Total

81.20

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Midwest
Bartlett Divis
850 West Bart
Bartlett, IL 60
Tel: (312) 289
Fax: (312) 28

ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82423

Sample Description: B-2-B; B-2
Suntec

Date Taken: 05-23-89 1640

Date Received: 05-23-89

VOLATILE COMPOUNDS

Acrolein	<10.	ug/g
Acrylonitrile	<10.	ug/g
Benzene	<1.0	ug/g
Bromodichloromethane	<1.0	ug/g
Bromoform	<1.0	ug/g
Bromomethane	<10.	ug/g
Carbon tetrachloride	<1.0	ug/g
Chlorobenzene	<1.0	ug/g
Chloroethane	<10.	ug/g
2-Chloroethylvinyl ether	<1.0	ug/g
Chloroform	<1.0	ug/g
Chloromethane	<10.	ug/g
Dibromochloromethane	<1.0	ug/g
1,2-Dichlorobenzene	<1.0	ug/g
1,3-Dichlorobenzene	<1.0	ug/g
1,4-Dichlorobenzene	<1.0	ug/g
1,1-Dichloroethane	<1.0	ug/g
1,2-Dichloroethane	<1.0	ug/g
1,1-Dichloroethene	<1.0	ug/g
cis-1,2-Dichloroethene	<1.0	ug/g
trans-1,2-Dichloroethene	<1.0	ug/g
1,2-Dichloropropane	<1.0	ug/g
cis-1,3-Dichloropropene	<1.0	ug/g
trans-1,3-Dichloropropene	<1.0	ug/g
Ethyl benzene	<1.0	ug/g

Results on a dry weight basis.

Neal E. Cleghorn
Neal E. Cleghorn
Project Manager



NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Midwest,
Bartlett Division
850 West Bartlett
Bartlett, IL 60010
Tel: (312) 289-1100
Fax: (312) 289-1101

ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Willmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82423

Sample Description: B-2-B; B-2
Suntec

Date Taken: 05-23-89 1640

Date Received: 05-23-89

Methylene chloride	<5.0	ug/g
1,1,2,2-Tetrachloroethane	<1.0	ug/g
Tetrachloroethene	<1.0	ug/g
Toluene	<1.0	ug/g
1,1,1-Trichloroethane	<1.0	ug/g
1,1,2-Trichloroethane	<1.0	ug/g
Trichloroethene	<1.0	ug/g
Trichlorofluoromethane	<1.0	ug/g
Vinyl chloride	<10.	ug/g
Xylenes, Total	<1.0	ug/g
Isopropanol	<10.	ug/g

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager



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ANALYTICAL REPORT

Mr. Mike Roche
ERM-NORTH CENTRAL, INC.
102 Wilmot Road, Suite 300
Deerfield IL 60015

06-13-89

Sample No.: 82424

Sample Description: B-3-D; B-3
Suntec

Date Taken: 05-24-89 1150

Date Received: 05-24-89

Solids, Total

87.54

%

Results on a dry weight basis.


Neal E. Cleghorn
Project Manager